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A COMPENDIUM OF COMPUTER CODES USED IN PARTICLE ACCELERATOR DESIGN AND ANALYSIS

AUTHORS: Los Alamos Accelerator Code Group

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Batavia, Illinois
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MASTER
A COMPRENDIU OF COMPUTER CODES
USED IN
PARTICLE ACCELERATOR DESIGN AND ANALYSIS

by the
Los Alamos Accelerator Code Group

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is made to United States patents and publications for which the Los Alamos Laboratory may be
liable.
1 INTRODUCTION

Support for this compilation has been provided by the Offices of High Energy and Nuclear Physics, U.S. Department of Energy. We are extremely grateful for their foresight.

In searching the accelerator literature, we have come across only two previous comprehensive surveys of useful accelerator codes. The first was a book by John Colonias, “Particle Accelerator Design: Computer Programs,” Academic Press (1974). The second was a review article by Joergard Keil, “Computer Programs in Accelerator Physics,” in “Physics of High Energy Particle Accelerators,” (SLAC Summer School, 1982) edited by Melvin Month, American Institute of Physics, AIP Conf. Proc. No 105 (1983). Colonias gives a comprehensive discussion of 35 codes. Keil mentions 21 codes. There are only 3 codes that are mentioned in both surveys. This is perhaps an indication of how rapidly codes become obsolete and new codes are written.


In preparing this compilation, we came across the names of more than 150 programs that have been used in the design and analysis of accelerators. Many are obsolete and some are not easily transported from the institution where they were created. All are included in this compilation and filed at Los Alamos, but the obsolete codes have been removed from this article. Other than the judgement as to whether or not a particular code is obsolete, we have not made any critical evaluations.

Computer codes and code compilations share the common problem of obsolescence. This compilation will probably be almost useless in three years or less. Useful codes become widely distributed. Users make improvements in distributed code, and the original author loses control over the evolution of the code as variations proliferate. Many times authors tire of maintaining, documenting, and distributing their codes. Every generation of accelerator physicists produces code builders, persons who feel that they can design more comprehensive or easier to use codes to do the tasks done by previous codes.

On the whole this environment of change is healthy, but when the number of codes and the variation on the same code become too large, there is a legitimate
concern about duplication of effort and confusion in comparing the outputs of different codes that supposedly do nearly the same calculations.

It might be useful to establish a mechanism for evaluating and making comparisons between codes. Such a mechanism would also be useful in maintaining and guiding the evolution of codes abandoned by the original authors and in setting standards for types of input, output, and documentation.

The design of the next generation of high energy accelerators will probably be done as an international collaborative effort and it would make sense to establish, either formally or informally, an international center for accelerator codes with branches for maintenance, distribution, and consultation at strategically located accelerator centers around the world.

This arrangement could have at least three beneficial effects. It would cut down duplication of effort, provide long-term support for the best codes, and provide a stimulating atmosphere for the evolution of new codes. It does not take much foresight to see that the natural evolution of accelerator design codes is toward the development of so-called Expert Systems, systems capable of taking design specifications of future accelerators and producing specifications for optimized magnetic transport and acceleration components, making present day programs such as TRANSPORT, POISSON, and SUPERFISH as tools in the optimization process. Such a program would also serve to codify the experience of two generations of accelerator designers before it is lost as these designers reach retirement age.

It is our hope that this compilation will stimulate some thought in this direction. This compilation was assembled by first sending a questionnaire to everyone that we could find who had written a code that might be useful in accelerator design and analysis. About one-third of the questionnaires were returned. We then set about searching the literature for descriptions of the remaining codes. We also telephoned authors when we could not get sufficient information from the literature. Certainly there are useful codes that we did not find. We solicit the readers of this document to write to us about our omissions as well as any errors in content. We are planning to update this document at least once.

This document is organized so that each code is described on a one- or two-page data sheet. The data sheets are arranged alphabetically by code name but are not numbered. In this way, it will be easy to insert new codes as they are discovered. There are a number of simulation codes that have no names, and we have not taken the time to obtain detailed information on all of them. However, there are two fairly current codes that we thought worthwhile to include here. Therefore we have arbitrarily assigned them names. One of these is a CERN code by Myers, which we have called BEAMBEAM and the other is a DESY code by Prwinski, which we have called BMHMM.

The code data sheets are preceded by three indexes: 1 subject, 2 people to contact, and 3 code acronym. It was not useful to list codes by authors because, in many cases, the original author is no longer associated with the code and many other persons have contributed to maintaining and improving the code.
We would like to thank those who replied to our request for information. Special thanks goes to Roger Peng, who did most of the organization and typing, and to Gary Benson, who wrote the $\TeX$-formatting macro for the data sheets. It is our sincere hope that this document will be helpful to persons entering the accelerator field. It has certainly been a revelation to us.

Before closing this introduction, I would like to bring up a very important point. This compilation is continuously updated by the Los Alamos Accelerator Code Group. If you know of computer codes for particle accelerator design and analysis which are not included in the compilation here, please inform us by sending the name of the code, a brief description, and an address for further contact. Your effort will help in creating a more comprehensive compilation and will be appreciated by the accelerator community. A copy of this compendium and further updates are also available from us. Our address is

Los Alamos Accelerator Code Group  
AT-6, Mail Stop H 829  
Los Alamos National Laboratory  
Los Alamos, NM 87545

Telephone: (505)667-2839 or  
FTS 843 2839
ANALYSIS - Impedances
  KNTE
  MAFIA

ANALYSIS - MISALIGNMENTS ORBIT CORRECTIONS
  ALIGN
  CODINV
  MICADO
  PETROC
  PETROS

ANALYSIS - Space Charge Effects
  KOBRA
  ZFIELD

ANALYSIS - Spin Depolarization
  SLIM

ANALYSIS - Stability
  AZTEC
  BBI
  MARYLIE
  MAFIA
  PETROS
  SLIM
  SCHAR
  SYNCH
  TRANSVRS
  ZAP

ANALYSIS - Wakefield Effects
  BCI
  MAFIA
  SIMTRAC
  TBCI
  TRANSVRS

ANALYSIS - Other
  BM2D (General magnetic field calculations in 2D)
  CARMEN (General magnetic field calculations in 3D)
  EBQ (Particle Distributions)
  SLIM (Depolarization of Electron Beams)
  ZAP (Intrabeam Scatter, Gas Scatter, Touschek Effect)

COMPONENTS - Ion Sources, Electron Guns
  AXCEL-GSI
  BEAM
  CARMEN
  EBQ
  Egun
  KOBRA
  MA6K
  RAY
  SLEAH
  SNW
  SIMTRAC
  WIN
COMPONENTS-Wafering
PARMEN
DELD
DESDIRA
SOODYNET
DEFI 3D
EMD
FATIMA
FORGY (See TRIM)
SPUN3D
LINDA
MADEST
MAFCO
MAFCO-W
MAGFOR
MAGNET
MAGNUS
PANPIRA GROUP CODES
PAPI DOPT
PL2D
POISCR
POISSON GROUP CODES
POISSON-BNL
POISSON-LBL
POISSON-TAC
PROFI
SATDSK
TOSCA
TRIDIF
TRIM(ANL)

COMPONENTS-RF Cavities
AZTEC
BCI
CAV1D
CAVIT
CURE
DISPER
DISPERSION
HAX
H2DB
LACC
LALA
LALAGE
LANS
LILA
LOOPER
Mafia
MESSYMESH
MULTIMODE
SCAM2D
PISCES
PRIDIM
PRIDO
PRIDOC
SHRIMP
SUPERFISH GROUP CODES
SWIL
TRANSYS
UPRAPE
UPREH
UPERL
UPERL T
COMPONENTS (linacs):  
- JASON Electrostatics  
- RELAX 3D 3D Electrostatics  
- RMKT Klystron  

OPTIMIZATION - Cyclotrons:  
- BEAMTRACE  
- COSY 5.0  
- GIOS  
- JOB-IN  
- SATISK  
- SINAC  
- TRAJECTORY  

OPTIMIZATION - LINACS:  
- EBO  
- HOPI  
- PARMILA  
- PARMTEQ  
- SCHAR  
- TRACE  
- TRACE3D  

OPTIMIZATION - Spectrometers, Transport lines:  
- BEAMTRACE  
- DIMAD  
- GIOS  
- HARMON  
- MAPPOT  
- MARYLIE  
- MIRKO  
- MOTE  
- PARMILA  
- PATH  
- PATRICIA  
- PINWHEEL  
- RAY  
- SYNCH  
- TPAMP  
- TRANCO  
- TRANSPORT  
- TRANSPORT LBL  

OPTIMIZATION - Synchrotrons:  
- AGS  
- BEAMTRACE  
- COSY 5.0  
- DIMAD  
- GIOS  
- HARMON  
- LATTICE  
- MAD  
- MARYLIE  
- MIRKO  
- PALHASEX  
- PARTRA  
- RING  
- SYNCH  
- TEAPOT  
- UGWAM
OPTICAL SYSTEMS
BEAMTRACE
COSY 5.0 (Optical Systems)
COMFORT (Insertion lines and circular machines)
DIMAD (Storage Rings)
MARYLIE (Beam Lines and Storage Rings)
OPTIC II (Electrostatic Accelerators)

SIMULATION TRACKING-Colliding Beams
BEAMBCAM
SBM 
SYMP 

SIMULATION TRACKING-Cyclotrons
BEAMTRACE
COSY 5.0
GIOS
NAJO
PINWHEEL
SINAC
TRAJECTORY

SIMULATION TRACKING-LINACS
BEDLAM
CCRTRACE
DECA/-TURTLE
EBQ
GENMAP 3.0
GIANT
LTRACK
MAFCO III
MOTION
PARMELA (Electron)
PARMILA (Ion)
PARMTEQ (RFQ)
RAYTRACE
RFQLIB
SCHAR
SCOP-2
SCOP-RZ
TRACE3D
ZFIELD

SIMULATION TRACKING-Synchrotrons
ARCHSIM
COSY 5.0
DECA/-TURTLE
DIMAD
E VOL
GENMAP 3.0
GIOS
LATTICE
LIEPOT
LILA
LIMATRA
MAFCO III
MARYLIE
MATTRACE
MIRKO
PAIPET
PAPRA
PAPIRA
PATTY
PETRO
PETROS
RACETRACK
RING
SCOP-2
SCOP-RZ
SIMTRAC
SLIM
SYNCH
TEAPOT

SIMULATION TRACKING-Spectrometers
BEAMTRACE
PINWHEEL
TRACK

SIMULATION TRACKING-Storage Rings
DIMAD
LATTICE
MARYLIE
SCOP-2
SCOP-RZ
SYNCH

SIMULATION TRACKING-Transport and Beam Lines
MARYLIE
MOTION
REVMOC
SPEAM VI
TRAMP
TRANCO
TRANSPORT
TRANSPORT_LBL
TRIO
TURTLE

SIMULATION TRACKING-Other
COSY 5.0 (General Optics)
GOC3D (General Magnetic Field)
KOBRA (Space Charge Effects)
MAFCO III (General Field Configurations)
MISAR (Intense Beam Accumulator Rings)
OPTIC II (Electrostatic Accelerators)
STNAC (General Magnets)
SOTRM (Generate Transport Matrices from Magnetic Field)

OTHER APPLICATIONS-
COMFORT (Control Program)
GIANT (Control Program)
GO (Executive Program)
GRAPHIC (Executive Program)
HETC (Target and Shielding Design)
HOPF (Control)
ISIS (Modeling of Intense Charged Particle Beams)
ITS (Charged Particle Transport Code)
MARTUR (Radiation Loading Calculation)
MEBT (Beam Diagnostics)
SOTRM (Generate Transport Matrices from Magnetic Field)
TRANCO (Control)
WAVE (Laser Beam Wave Acceleration)
WISWAM (Electron Storage Ring and Wigglet Performance)
<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
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<td>MICADO</td>
<td>SCHAR</td>
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<tr>
<td>EFFI(3D)</td>
<td>MIRKO</td>
<td>SCOP-2</td>
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<td>EGUN</td>
<td>MISAR</td>
<td>SCOP-RZ</td>
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<td>EMD</td>
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<td>FORGY</td>
<td>NAJO</td>
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<td>GENMAP 3.0</td>
<td>OPTIC II</td>
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<td>GIANT</td>
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<td>GO</td>
<td>PAQUASEX</td>
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<td>TRAMP</td>
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<td>KN7C</td>
<td>PETROC</td>
<td>TRAJECTORY</td>
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</table>
Date of Latest Version: unknown

Program Name: AGS

Person to Contact: E. Keil
Address: LFP Division
CERN
1211 Geneva 23
Switzerland

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF-cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program AGS computes the transformation matrices of the elements that make up the synchrotron, computes the betatron and closed orbit functions, the coordinates of the equilibrium orbit, and other pertinent quantities. A typical run is completed in less than one minute. Memory requirements depend on the number of elements that the program can handle. For maximum efficiency the program is over 30,000 elements can be accommodated in less than 50K memory locations. Program AGS is, in many respects, similar to program SYNCH.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
No longer supported by the authors

Source language: FORTRAN

Computers it runs on: CDC 6600

It is available as:
Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Tape format:
Diskette size A format:

Available through DECNET, ARPANET, BITNET

Network Address: keil@cern.ch
Person to Contact: Elon R. Close MS-70B 2230
Address: Lawrence Berkeley Laboratory
1 Cyclotron Rd.
Berkeley, CA 94720
USA

Telephone Number: 415-486-6166, FTS 451-6166

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances, Closed Orbit Correction

Other:
Short Description: (Purpose, capabilities, algorithms, special features, etc.)
This code simulates survey misalignments of magnetic elements in a circular accelerator. It constructs a closed orbit corresponding to the misalignment errors and finds corrector strengths needed to sustain a particle beam within the vacuum chamber. This is a Monte Carlo type program that performs a collection of misalignments over an ensemble of machines. ALIGN was developed and used for the construction of PEP has been exported to CERN where it was used in the design of LEP.

Publications describing the code:

Is code documentation available? Yes

How may the code be obtained:
Call Elon R. Close

Source language: FORTRAN

Computers it runs on: CDC

It is available as:
- Source code
- Executable only

Source Media: Machine, Tape, Diskette, Cards, Networks

Tape format:
Diskette size & format:

Available through: DECNET, ARPANET, BITNET

Network Address:
Date of Latest Version: July 1986

Person to Contact: Henry A. Flesness
Address: MP-14, MS B845
Los Alamos National Lab.
Los Alamos, NM 87545
USA

Telephone Number: 1-505-667-4991, FTS 443-4991

Classification of Computer Code:

- Component Design:
  - RF cavity

- Accelerator Optimization:
  - Linac, Cyclotron, Synchrotron

- Tracking or Simulation:
  - Linac, Cyclotron, Synchrotron

- Analysis:
  - Stability, Impedances

- Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

ARCHSIM simulates the acceleration cycle of a rapid-cycling proton synchrotron. A lattice can consist of up to 100 cells and RF cavities. Transport of the beam in six dimensions includes all second-order optical terms. The field and proton velocity are treated exactly. Longitudinal space charge is handled by a self-consistent method. The fluctuations due to the finite number of particles are handled by a Gaussian smoothing algorithm. The program runs on a VAX 11/780 and can track 100 particles without space charge through the full acceleration cycle from 0 to 32 GeV in 49 minutes of computer time. A thousand particles with space charge takes about ten hours of computer time.

The motivation for writing this tracking program was the need to explore the effect of various accelerator cavity parameters on the beam dynamics and stability. A proposed 32 GeV rapid-cycling synchrotron

Currently, the program is being revised to improve the graphics (phase space plots and particle distribution histograms) and the number and type of optical elements available. The program uses second-order transport matrices generated by another program like DIMAT. These matrices are checked to see if they are consistent before doing the simulation.

Publication describing the code:


Documentation available? Yes, No

How may the code be obtained?

- Henry A. Flesness
- Source Language: FORTRAN

Computer System: VAX 11/780
It is available as: □ Source code. □ Executable only

  Tape format: □ Track 1000 rpm
  Diskette size & format:

Available through: □□ DECNET. □ ARPANET. □ BITNET

Network Address: hangar.danaarpa
Person to contact: Public
Address: GSF Darmstadt
Postfach 14 60
7600 Darmstadt
Fed Rep Germany

Telephone Number: 0 7 1 3 0 4 2 3

Classification of Computer Code:
Component Design:
\( \checkmark \) Ion Source, \( \checkmark \) Magnet, \( \checkmark \) RF cavity, \( \checkmark \) Electron Gun, DC Beam Transport

Accelerator Optimization:
\( \checkmark \) Linac, \( \checkmark \) Cyclotron, \( \checkmark \) Synchrotron

Tracking or Simulation:
\( \checkmark \) Linac, \( \checkmark \) Cyclotron, \( \checkmark \) Synchrotron

Analysis:
\( \checkmark \) Stability, \( \checkmark \) Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.):
2D code, cylinder symmetry, plasma boundary, electrons and ions, cathode simulation, plasma simulation, including symmetric magnetic fields. Interactive code. Diagnostic trajectories, emittance transfer, energetic.

Publications describing the code:
Peter spadtke: "Computer Simulation of High Current DC Ion Beams," Proc 1984 Linear Accelerator Conf, Seattle May 7-11, 1984, GSF Darmstadt internal report GSF 8411

1. Computer Program; 4. Version:

1.1 Code documentation available: \( \checkmark \) Yes \( \checkmark \) No

How may the code be obtained?

Source code:

Can be run on IBM PC

Distributed in source code:

Available through DECnet, IBM, ARPA, ADP, MIT, MCI

Contact: Peter spadtke

Date of latest version: }.

Program Name: }.
Date of Entry: 4/22/72

Program Name: A°TIE

Person in Charge: J. Baker

Address: Lawrence Berkeley Laboratory

Bldgs. 50 & 51

Berkeley, CA 94720

Telephone Numbers: 476-2500, 476-2560

Classification of Computer Code:

Component Design:
Ion Source, Magnet, RF cavity.

Accelerator Optimization:
Lmac, Cyclotron, Synchrotron.

Tracking and Simulation:
Lmac, Cyclotron, Synchrotron.

Analysis:
Stability, Impedances.

Other

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A°TIE calculates the fields due to an azimuthally bunched beam in a cylindrically symmetric structure of arbitrary geometry. The computed fields are then used to calculate the self impedance of the beam for stability studies. Any combination of metallic, magnetic and conducting materials is allowed. Material properties are assumed to be isotropic and linear. Boundaries between different materials within the problem space may be arbitrary curves as may the contour defining the beam region.

Publications describing the code:


Code documentation available: Yes / No

How can the code be obtained:

Contact the authors

Compiler requirements:

IBM compatible

Others:

Lanczos, Fortran, Executable only.

Hardware required:

Lepke IBM System 360

A tape format

JP-1

ARPA-11

KIL-14
**Classification of Computer Code:**
- Component Design
- Ion Source
- Magnet
- RF cavity
- Accelerator Optimization
- Linac
- Cyclotron
- Synchrotron
- Tracking or Simulation
- Linac
- Cyclotron
- Synchrotron
- Analysis
  - Stability
  - Impedances

**Short Description:** Purpose, capabilities, algorithms, special features, etc.
- Calculation of bunched beam instabilities
  - Longitudinal transverse coupled bunch modes
  - Bunch lengthening, transverse mode coupling
    - Scale shifts, intra-beam scattering, etc.

**Publications describing the code:**
- Internal CERN Report CERN Theory Note

**Code documentation available:** Yes

**How can the code be obtained:**
- Contact the authors: FORTRAN
- Contact the authors: C
- Contact the authors: FORTRAN
- Contact the authors: C

**Language and environment:**
- FORTRAN
- Compiled or uncompiled
- IBM System 370, System/360, or equivalent

**Version:**
- FORTRAN
- ARPA-44
- BHE-44
Date of Latest Version: Jan 1981

Person to Contact: Murray Shubaly
Address: Group ATAM-8817
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505-667-9424, FAX 661-9424

Classification of Computer Code:
Component Design:
Ion Source, RF cavity,
Accelerator Optimization:
Linac, Cyclotron, Synchrotron,
Tracking or Simulation:
Linac, Cyclotron, Synchrotron,
Analysis:
Stability, Impedances,
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
BEAM (Beam Extraction and Acceleration Modeling) is a second generation 2D ion source code based on XHITEL, with some features from SNOW. It has the following capabilities: Starting from the unperturbed plasma, the code calculates ion trajectories and electrostatic potentials, the electrode boundaries need not coincide with mesh lines, the mesh density is variable to permit finer resolution in critical regions. Both extraction and injection calculations are possible, with variable current density in the source plasma. Variable ion injection energy and angle, and finite ion temperature effects. Space charge neutralization is included. The output of the code gives values of rms emittance, divergence and radius, maximum divergence and radius, and overlapped equipotential and trajectory plots. Both rectangular and cylindrical geometry are treated. It does not at present handle axial magnetic fields. An improvement is planned in the near future. Only partially complete documentation is available, but the coding is well commented.

Publications describing the code:

Is code documentation available? •Yes •No

How may the code be obtained?
Murray Shubaly or The Los Alamos Accelerator Code Group 505-667-9424, 505-661-9424

Source Language: Fortran IV

Computer it runs on: CDC 7600 CYBER 170 IBM

Data available as: • Source code, • Executable only

source, tape, diskette, cards, network

Output format: Tape, diskette, network

Available through: BLQ1M, CARPANEL, PLANET

Note: This code was last updated: 
Classification of Computer Code:

Component Design:

Ion Source, Magnet, RF cavity

Accelerator Optimization:

Linac, Cyclotron, Synchrotron

Tracking or Simulation:

Linac, Cyclotron, Synchrotron, x Colliding Beams

Analysis:

Stability, Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A multi-particle two-beam (strong-strong) simulation program has been written for investigation of the beam-beam effect in LEP. The motion of the superparticles is treated in six-dimensional phase space and the effects of quantum excitation and radiation damping are included. The effects of perturbations to the superparticle trajectories are also included. Non-zero dispersion at the RF cavities allows computations of single-beam synchrotron resonances.

After each revolution the parameters influencing the beam-beam force (e.g., the beam dimensions and the beam current) are reevaluated in order to simulate a real situation. For the beam-beam force in an elliptical beam with Gaussian charge distribution has been assumed. The computation of this force is speeded up by using fluctuated values of the complex error function and a fast interpolation procedure.

The initial distribution of a large number of particles is typically 1000 in the three phase planes. A random walk is performed with pre-specified variances. Each particle in each beam is tracked through an RF cavity and a beam-beam interaction and the traversing of a machine and. This procedure is repeated until each beam has completed one turn. The position of each particle is then compared with aperture limitations, typically 4% and these particles which fall outside are excluded from further tracking. The remaining particles are then used to recalculate the beam current, the specific beaminess, the beam variances and hence the new beam-beam kick parameters. This cycle is repeated until the beam has been simulating for about 10 damping times.

Publication describing the code:


Software documentation available: Yes

License fee for code be obtained: No
Date of Latest Version: [ ]

Person to Contact: M. Heras or H. Willink
Address: DESY Physical Institute
Bernhard Bolling 11-16
24049 Geesten,
18-4 Rep. Germany

Telephone Number: +49 702 2770

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
- Static optical system

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
- Mass spectrometers

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
- Initial code, now beam elements, space charge, transport beam by 2nd order matrices

Publications describing the code:
- H. Willink, J. Breuna, and M. Heras, "GIS Beam Trace, a program for the design of high resolution mass spectrometers," 2nd Int. Conf. on Charg. Particle Optics, Albuquerque, May 19-23, 1986 (in published in Nucl. Inst. Meth.)
- GSI report THD 85, Darmstadt (1983)

Is code documentation available? [ ] Yes [ ] No

How may the code be obtained?

Source Language: FORTRAN

Computer System:
- IBM 4300 series

Do code run on IBM, Cyber, VAX, etc.?
- Yes

Do code run as in source code, Executable only?
- Source, object, link, executable

Do code run on 80286, 80386, etc.?
- Yes

Do code run under Unix, VMS, Windows, etc.?
- Yes

Do code run only on special hardware?
- No

Available Code:
- DECNET
- ARPA NET
- Odyssey

Network Adherent to:
- Odyssey
BEDLAM is a fourth-order moment simulation code. The beam at the input to a linear accelerator is specified as a collection of moments of the phase-space distribution. Then the moment equations, which describe the time evolution of the moments, are numerically integrated. No particles are traced in this approach. The computed distribution and the external forces are computed consistently to a given order of accuracy. Although BEDLAM includes moments to fourth order only, it could be systematically extended to any order. Another feature of this method is that physically interesting and intuitive quantities, such as beam sizes and rms emittances, are computed directly. This code is still under development to include space-charge effects.


Is code documentation available? Yes No

How may the code be obtained?
Les Mimes Accelerator Code Group, (505) 365-6677 or 667-2839

Source language FORTRAN

Compiler Fortran IV or V

In addition to source code, Executable only

Source: Print Tape, Diskette, Cards, Network

Tape for: all computers

Diskette for: IBM

Available through: DECNET, ARPANET, BITNET

set your where-are-you
Classification of Computer Code:
Component Design:
Ion Source, \( \Xi \) Magnet, \( \Box \) RF cavity.
Accelerator Optimization:
Linac, \( \Pi \) Cyclotron, \( \alpha \) Synchrotron.
Tracking or Simulation:
Linac, \( \Pi \) Cyclotron, \( \alpha \) Synchrotron.
Analysis:
Stability, Impedances, \( \delta \) General purpose magnetic field calculation in 2D.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

BIM2D is an interactive computer program for solving linear magnetostatic problems using boundary integral methods.

The computer model assumes that the magnet can be represented by a two-dimensional cross-section of iron and conductor regions. The permeability in each iron region and the current density in each conductor region are specified constants which can be changed between repeated analyses. The limitation to fixed permeability allows an integral formulation where only the edges of the iron cross-section need to be meshed. The analysis is performed very quickly on-line so that the system is truly interactive.

Input to the program is via a graphics terminal and is completely interactive. As the magnet data are input, the model is displayed on the terminal screen. Any errors can be seen and corrected immediately.

Magnetic fields can be calculated at points along a line or over a grid, displayed as contour maps or graphs and resultant forces can be obtained. Drawings, graphs and plots are available as output.

Publications describing the code:

* Report RI 79-099 (1979)
* Ref 28631

Source documentation available: \( \bigstar \) Yes  \( \times \) No

How can the code be obtained?

By arrangement with Vector Fields Ltd

Source language: FORTRAN V.

Computer it runs on: PRIME VAX.
It is available as:  ☐ Source code,  ☐ Executable only

Source Media:  ☐ Listing, ☑ Tape, ☐ Diskette, ☑ cards, ☐ Networks

Tape format: As required
Diskette size: As format:

Available through:  ☐ DECNET, ☐ ARPANET, ☐ BITNET

Network Address:
Date of Latest Version: unknown

Person to Contact: A. Pawlinski
Address: DESY

Street, line 85
2000 Hamburg 32
1st Rep. Germany

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
- Colliding Beams

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The beam-beam interaction was simulated on a digital computer taking into account the horizontal and vertical betatron oscillation, the synchrotron oscillation, a horizontal dispersion at the interaction point, quantum fluctuations, damping and the exponential decay of the voltage at the separators. The space charge forces were derived from the exact potential of a time-independent gaussian bunch. The calculations were made for 10000 points and then quadratically interpolated for each passage. The simulation was done for 225 particles starting with a gaussian distribution. The beam height and the beam width were calculated as the root mean square of the coordinates of the particles at the interaction point during 20 revolutions. The collision of two strong bunches was also simulated.

Publications describing the code:


Is code documentation available? Yes/No

How may the code be obtained?
unknown

Source Language:

Computers it runs on:

It is available as: Source code/Executable only

Source Media: Tape/ Diskette/ Card/ Networks

Tape format

Diskette format

Available through: DEFY CARPAMP XEYPET

Network Address:
Classification of Computer Code:
Component Design:
   \( \text{Ion Source, Magnet, RF cavity, } \)
Accelerator Optimization:
   \( \text{Linac, Cyclotron, Synchrotron, } \)
Tracking or Simulation:
   \( \text{Linac, Cyclotron, Synchrotron, } \)
Analysis:
   \( \text{Stability, Impedances, General purpose magnetic field, trajectory and eddy current in 3D} \)
Other:
Short Description: (Purpose, capabilities, algorithms, special features, etc.)
CARMEN is an advanced program for the calculation of eddy currents in three dimensions. The algorithm used in CARMEN gives nearly optimal economy for magnetic field computation and it is implemented using state-of-the-art numerical methods. In addition to magnetic fields the program can also be used to model any system governed by Poisson's equation. This includes electrostatics and current flow.

Applications include fusion magnets, particle accelerators, MRI gradient field eddy currents, non-destructive testing, electrical machines, eddy current heating, electron lenses and deflection magnets.

CARMEN uses a discrete finite element model in order to solve the partial differential equations governing the behavior of a system.

The mesh is formed from hexahedra with ruled faces which are automatically subdivided into elements. A 2D grid is created initially and this can then be swept through space thus creating 3D volumes. The sweep operations include translation, rotation and projection.

The mesh primitive blocks are assigned material names and geometric properties for example orientation.

CARMEN uses 8 and 20 node isoparametric brick elements \( \text{HE, } \) as can be mixed together. The program will maintain inter element continuity. The type of element created in each primitive may be selected by the user. This allows the higher order elements to be used where solution accuracy is important. The result evaluation modes are provided to give a choice between speed and accuracy.

The suite of programs was designed to be used as a distributed computing environment. That is files created for CARMEN can be easily transferred between computers and result files from CARMEN can be re-run. CARMEN provides full checkpoint/chop file and restart facilities to maximize the efficient use of computer resources. The PCARMEN program allows results to be displayed graphically and further calculations can be performed on particle trajectories.
Publications describing the code:
- Data sheet No 028571 from Vector Fields.

Is code documentation available?  X  Yes  ❌  No

How may the code be obtained?
  By licence agreement with Vector Fields, Ltd.

Source language: FORTRAN 77

Computers it runs on: PRIME, VAX, IBM

It is available as:  X  Source code,  ❌  Executable only

Source Media:  Listing, ❌ Tape, ❌ Diskette, ❌ Cards, ❌ Networks
  Tape format: As required
  Diskette size & format:

Available through:  ❌ DFCNET,  ❌ ARPANET,  ❌ BITNET

Network Address:
Date of Latest Revision: Apr 1985

Person to Contact: Dr. Wolfgang Wilhelm
Address: Physik Department E12, Technische Universitat Munchen, 8046 Garmen

Telephone Number: sec 300 2435

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linear
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linear
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
CAVIET is a 2D code for cavities with constant cross-section, the calculation is performed in a square mesh, accuracy is better than 1 percent.
CAVIET calculates low frequency modes of any cavity with a 3D cubic mesh, and accuracy of about 5 percent.

Publications describing the code:
W. Wilhelm Particle Accelerators 12 (1984) 149

Is code documentation available? Yes

How may the code be obtained?
From the author

Source Language: FORTRAN

Computer it runs on: Cyber 205

File available as: Source code

Source Media: Listing, Tape

Diskette: Cards

Network Access: DCE/NET, ARPANET, BITNET

Network Adviser
Date of Latest Version: Dec 1985
Program Name: ICETRACE

Person to Contact: Roger Cole MS 410
Address: MS 4100, Group MP 4
Los Alamos National Laboratory
Los Alamos, NM 87545

Telephone Number: 505 667-7193, FTS 843-7193

Classification of Computer Code:
Component Design:
- Ion Source, "Magnet," RF cavity, "" Accelerator Optimization:
- Linac, "" Cyclotron, "" Synchrotron, "" Tracking or Simulation:
- Linac, "" Cyclotron, "" Synchrotron, "" Analysis:
- Stability, "" Impedances, ""

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

ICETRACE is a first order envelope tracing code, currently for transverse effects only. The "guts" of
ICETRACE is a subroutine library with powerful, simple interface. The operator interface runs on
color CRT in CR or on V1400. It was designed for use on the Los Alamos Meson Physics Facility
(LAMPF) accelerator.

Publications describing the code:
MP 143612 (A Los Alamos National Laboratory internal report)

Is code documentation available? Yes No

How may the code be obtained?
Not available.

Source language(s): FLICS

Computers it runs on: VAX, VMS

Does it run on: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Tape format

Diskette size & format

Available through: DECNET, ARPANET, BBNET

Network Access
A certain class of magnet misalignments in storage rings and other accelerators produces closed-orbit distortions (CODs). Quite often the CODs are measured at a few number of locations (N) than the number of misalignment parameters (M). There is a linear relation between COD measurements, uy at 1, ..., N and the misalignment parameters {eik}, k = 1, ..., M. Hence the eik's are under-determined, if M > 2N, one can obtain an overdetermined set of equations for measuring the COD at two different quadrupole settings. There are several ways of inverting the COD measurements to get the misalignment parameters that are fairly insensitive to errors in the measured CODs. A computer program called CODINV has been written to test some of these schemes. Two schemes give fairly good results when applied to the lattice of the Los Alamos Proton Storage Ring (PSR). The first scheme requires measurements at two nearby tunes and the use of singular value decomposition methods. The second scheme requires measurements of the CODs in the EODO and ODOO cell arrangements but is easier mathematically.

Publications describing the code:


1. code documentation available? Yes. No

How may the code be obtained?

Contact Barbara Oudet, AL-3, MS ID00, Los Alamos National Laboratory, Los Alamos, NM 87545.

source language: Fortran 77

Computer it runs on: Any

It is available as: source code (Acceptable only)
Source Media: Listing, Tape, Diskette, Cards, Networks
Tape format: track, format, length
Diskette size & format:
Available through: DECNET, ARPANET, BITNET
Network Address: iseland.nwp
Date of Latest Version: Unknown

Person to Contact: Emeril Shakes
Address: 3049 W. 25th St.
Protea 1414
Stanford, CA 94305

Telephone Number: 415-434-4999

Classification of Computer Code:
Component Design
- Ion Source, Magnet, RF cavity,
Accelerator Optimization
- Linac, Cyclotron, Synchrotron, Insertion lines and circular machines
Tracking or Simulation
- Linac, Cyclotron, Synchrotron.
Analysis
- Stability, Impedances,
Other

Short Description: A lattice program for analysis and control of charged particle beam transport systems. Main features include:

- MAD style input format
- Linear lattice parameter
- Linear lattice matching
- Chromaticity correction
- Beam and RF parameter calculations for rings

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
- Personnel at site
- Written request ARPA/NA

Computer Operated

- IBM System 360/65, IBM 3081, IBM 370

Prepared in source code, Transfer only:
- Media: Tape, Diskette, and Network

Available through: NLR 311 ARPA 311 NII 311
Date of Latest Version: 1986

Person to Contact: Martin Berr or H. Wolnik
Address: I2 Physical Institute
           Heinrich Buffle 4-14
           6300 Giessen,
           Fed. Rep. Germany

Telephone Number: 641 702 2770

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron, Optical Systems
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Fifth order matrix transport and method of power series tracking, usual beam line elements, arbitrary field distributions and fringe fields, fitting capabilities, space charge (under development); very general input language.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
Contact above address

Source language: FORTRAN

Computers it runs on: VAX, Cyber, CRAY

It is available as: Source code, Executable only

Source Media: CD ROM, Tape, Diskette, Cards, Network
- Tape format accepted
- Diskette size & format accepted

Available through: DEANET, ARPANET, BITNET

Network Addresses: not defined/known
Date of Latest Version: 1971

Person to Contact: C. Iselin
Address: CERN
                      1111 Geneva 23
                      Switzerland

Telephone Numbers: (022) 80 23 77 or (022) 80 23 57

Classification of Computer Code:
  Component Design:
  - Ion Source,  Magnet,  TRF cavity.
  Accelerator Optimization:
  - Linac,  Cyclotron,  Synchrotron.
  Tracking or Simulation:
  - Linac,  Cyclotron,  Synchrotron,  Beam Transport

Analysis:
  - Stability,  Impedances.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc)

Tracking of particles with first and second order matrix formalism. Optional Decay included.

Publications describing the code:
  CERN 74-02

Is code documentation available?  Yes  No

How may the code be obtained?
  Contact C. Iselin. You can also contact Dave Carey at Fermilab (708) 460 6511

Source language: FORTRAN 66

Computes it runs on: IBM CDC

It is available as:  Source code,  Executable only

Source Media:  Lasting:  Tape,  Diskette,  Cards,  Network
  Tape format:  up to 1000 bpi
  Diskette:  size & format.

Available through:  DECNET,  ARPANET,  IBM 344

Contact Address:  Post CERN
Person to Contact: Fan Mingwu
Address: Institute of Atomic Energy
P.O. Box 275
Beijing
P.R. of China
Telephone Number: Beijing 88221 ext 331

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Calculate static magnetic field, electric field and eddy current problems in two cartesian-dimensions or cylindrically symmetric configuration with permeable iron. It is based on Finite Element Methods and consists of three codes: MESH2D, DEF2, and DEF2D

Publications describing the code:
Fan Mingwu, Xue Ye and Yan Wei, "DF2D - Interactive Software Package for 2D Magnetostatic, Electrostatic and Eddy Current Field Computations" IEEE Trans. Mag 21(1985)2549

Is code documentation available? Yes

How may the code be obtained?
Contact Institute of Atomic Energy at above address

Source language: FORTRAN 77
Computer it runs on: VAX, PDP, IBM, PUNCH

It is available as:
- Source code
- Executable only
Source Media:
- Tape
- Diskette

Tape format:
- Diskette format

Available through: DEFNET, ARPANET, BITNET

Network Access:
Program Name: DIFESEA

Date of Latest Version: 1974

Person to Contact: Herbert F. Vogel
Address: MS B220, Group X-2
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505-665-9949, FTS 843-9949

Classification of Computer Code:
Component Design:
- Ion Source, x
- Magnet, x
- RF cavity, x
Accelerator Optimization:
- Linac, x
- Cyclotron, x
- Synchrotron, x
Tracking or Simulation:
- Linac, x
- Cyclotron, x
- Synchrotron, x
Analysis:
- Stability, x
- Impedances, x
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
2-d eddy currents and their magnetic field, driven from a current source with arbitrary pulse shape. Implementation by modification of the Poisson code, i.e., current normal to the (B_x, B_y) or (B_x, B_z) plane.

Publications describing the code:
None

Is code documentation available? (Yes) [x] No

How may the code be obtained?
Source language: FORTRAN
Computers it runs on: CDC 7600

It is available as: [x] Source code, [ ] Executable only
Source Media: x Listing, x Tape, x Diskette, x Cards, x Networks

Lape format:
Diskette size & format:

Available through: [x] DECNET, [x] ARPANET, [ ] BITNET

Network Address:
Date of Latest Version:  Jun 1986

Person to Contact: R. Servranckx
Address: SLAC
P.O. Box 3049
Stanford, CA  94305
USA

Telephone Number: (415) 854-3300 ext 2741 or (306) 966-6054

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity, Rings, Beam Lines
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron, Rings, Beam Lines

Analysis:
- Stability, Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
1. General design settings
2. Basis: Transport, 2nd order formalism
3. Closed orbit studies: stable or unstable special resonance extraction studies
4. Extensive error and misalignment handling capabilities.

Publications describing the code:
SLAC Report 285 (PT-28(A))

Is code documentation available? Yes

How may the code be obtained?
Contact Roger Servranckx

Source language: FORTRAN

Computers it runs on: VAX, IBM, CDC

It is available as: Source code, Executable only
Source Media: Listing, Tape, Diskette, Cards, Network:
- Teletypewriter, PDP-11/34
- Diskette, tape, format

Available through: DECNET, ARPANET, BITNET

Network Address: RX - V - LACAM
Person to Contact: S. O. Schriber
Address: AL Division, MS R811,
Los Alamos National Laboratory
Los Alamos, NM 87545
USA
Telephone Number: (505) 667-7634, FTS 843-7634

Classification of Computer Code:
Component Design:
- Ion Source, ☑ Magnet, ☑ RF cavity, ☑
Accelerator Optimization:
- Linac, ☑ Cyclotron, ☑ Synchrotron, ☑
Tracking or Simulation:
- Linac, ☑ Cyclotron, ☑ Synchrotron, ☑
Analysis:
- Stability, ☑ Impedances, ☑
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Program DISPER does a weighted, non-linear, least squares fit to experimentally measured frequencies of mode spectra from arrays of RF cavities. The fit can be for singly or doubly periodic systems with up to second neighbor coupling constants and various end cavity terminations. The fit is to a model consisting of coupled RLC circuits.

Publications describing the code:

Is code documentation available? ☑ Yes ☑ No

How may the code be obtained?
From the author see above, H. Enteure, Inst. fur Kernphysik, Universitat Mainz, Postfach 3003, D-6500 Mainz, FRG; S. Inagaki, KEK National Laboratory for High Energy Physics, Oho-Machi, Tsukuba Gun, Ibaraki Ken, JAPAN 305-32

Source language: FORTRAN

Computer it runs on: CDC, CYBER

It is available as: ☑ Source code, ☑ Executable only
Source Media: ☑ Listing, ☑ Tape, ☑ Diskette, ☑ Cards, ☑ Networks
- Tape format
- Diskette size & format
Available through: ☑ DECNET, ☑ ARPANET, ☑ BITNET

Network Address:
Date of Latest Version: July 1985

Person to Contact: Eric N. Opp
Address: MRJ Inc., Suite 200
19455 White Granite Dr.
Oakton, VA 22124
USA

Telephone Number: (202) 385-0818

Classification of Computer Code:
Component Design:
- Ion Source, □ Magnet, □ RF cavity, □
Accelerator Optimization:
□ Linac, □ Cyclotron, □ Synchrotron, □
Tracking or Simulation:
□ Linac, □ Cyclotron, □ Synchrotron, □
Analysis:
□ Stability, □ Impedances, □
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

DISPERSION calculates the frequency dispersion relation ω(k) for the azimuthally symmetric modes in a periodic array of RF cavities. The code is a modification of the SUPERFISH package. The codes LATTICE (mesh generator) and SUPERFISH were modified. LATTICE was modified to set up the appropriate periodic boundary conditions for the basic structure cell.

Publications describing the code:


Is code documentation available? ☑ Yes ☐ No

How may the code be obtained?
Contact the Los Alamos Code Group, MS H329, Los Alamos National Laboratory, Los Alamos, NM 87545, phone 505-667-9677 or 667-2939

Source language: FORTRAN

Computer it runs on: CRAY X-MP

It is available as: ☑ Source code, ☑ Executable only

source Media: Listing, ☑ Tape, □ Diskette, □ Cards, □ Networks
- Tape format: □ 1000 fsp
- Diskette type: □

Available through: ☑ DECNET, ☑ ARPANET, ☑ BITNET

Network Address: hiu@lanlanpa
Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The FRQ (electric field E, magnetic field B, and space charge Q) code simulates steady-state problems involving space charge transport of charged particles in cylindrically symmetric devices, providing a fairly flexible and forgiving data input structure.

This two-dimensional program accepts data specifying the externally applied electric and magnetic fields. The electric and magnetic self fields of the particles are used to obtain self-consistent azimuthally symmetric charge and current distributions. The code follows particle trajectories and employs a unique method of assigning values of the charge density to grid points. This method provides sufficient accuracy to model the cancellation that occurs between radial electric and magnetic self forces in a relativistic beam.

The orbits are treated in cylindrical geometry (position and momentum) with \( z \) as the independent variable. Poisson's equation is solved in cylindrical geometry on an orthogonal rectangular mesh.

FRQ can also handle problems involving multiple ion species where the space charge forces from each must be included—such problems arise in the design of ion sources where different charge and mass states are present.

Publications describing the code:
- Lawrence Berkeley Laboratory Internal Report LBL-14231

Is code documentation available?  Yes  No

How may the code be obtained?
- Contact Author

Source Language: FORTRAN
It is available as:  x Source code,  x Executable only

Source Media:  x Listing,  x Tape,  x Diskette,  x Cards,  x Networks

  Tape format:  7 track BCD
  Diskette size & format:

Available through:  DECNET,  ARPANET,  BITNET

Network Address:
Date of Latest Version: 1986

Person to Contact: Larry Turner
Address: Argonne National Laboratory
9700 S. Cass Ave
Argonne, IL 60439-4814
USA

Telephone Number: 630-926-3257, EXT 972-2357

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
- Eddy Currents

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
EDDYNET uses a wire grid approach to solve eddy current problems. The conducting surface is approximated by a quadrilateral mesh of conducting lines. Line resistances and loop inductances are defined in a manner consistent with the approximation. The system of loop equations with a dense matrix is solved repeatedly to give the time development of the eddy currents, magnetic field, and dissipated power.

Publications describing the code:

Is code documentation available? Yes / No

How may the code be obtained?
Contact Larry Turner

Source Language: FORTRAN
Computer Platforms: IBM CRAY

Available as: source code, executable only
Source Media: Listing, Tape, Diskette, Card, Network

Tape Format
Diskette Format

Available through: DODNET, ARPA, NUDNET

Notes, Addenda:
Date of Latest Version: unknown

Person to Contact: S. J. Sackett
Address: 422
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: (415) 422-8709, FTS 832 8709

Classification of Computer Code:
Component Design:
- Ion Source, X Magnets, RF cavity, ...
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron, ...
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron, ...
Analysis:
- Stability, Impedances, ...
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

EFFI calculates the electromagnetic field and vector potential in coil systems of arbitrary geometry. The coils are made from circular arc and/or straight segments of rectangular cross-sectional conductor. EFFI can also calculate magnetic flux lines, magnetic force, and inductance. The methods used for the calculations are based on a combination analytical and numerical integration of the Biot-Savart law for a volume distribution of current. These methods yield accurate field values inside and outside the conductor.

Publications describing the code:


Is code documentation available? Yes / No

How may the code be obtained?
unknown

Source Language: unknown

Computer it runs on: unknown

It is available as: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Tape format:

Diskette size & format:

Available through: DECNET, ARPANET, NIHNET

Network Address:
Classification of Computer Code:

Component Design:
- Ion Source, Magnet, RF cavity, Cen Design

Accelerator Optimization:
- Linac, Cyclotron, Synchrotron

Tracking or Simulation:
- Linac, Cyclotron, Synchrotron

Analysis:
- Stability, Impedances

Other:

Short Description:

The program is specifically written to compute trajectories of charged particles in electrostatic and magnetostatic focusing systems including the effects of space charge and self magnetic fields. Starting options include Child's Law conditions on cathodes of various shapes. Either rectangular or cylindrically symmetric geometry may be used. Magnetic fields may be specified using arbitrary configurations of coils, or the output of a magnet program such as Poisson or by an externally calculated array of the axial fields.

Publications describing the code:

SLAC 226

Is code documentation available? Yes No

How may the code be obtained?

Write or call W. H. Hermannsfeldt

Source language: FORTRAN

Computers it runs on:

It is available as: Source code, Executable only

Source Media: Magnetic, W C. Diskette, Discs, Networks

Format:
	Diskette size & format:

Available through:

DECNET, ARPANET, BITNET

Network Address: LACAMA/WISAL
Person to Contact: Ann Aldridge
Address: Group C-3, MS B265
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 7047, FTS 843 7047

Classification of Computer Code:
Component Design:

[ ] Non Source, [x] Magnet, [ ] RF cavity

Accelerator Optimization:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron

Tracking or Simulation:
[ ] Linac, [ ] Cyclotron, [ ] Synchrotron

Analysis:
[ ] Stability, [ ] Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

An AI (Expert) program for designing "H" type dipole bending magnets. Given particle, energy, bend angle, etc., it designs the coil using LAMPF standard conductor, determines ΔP, ΔT, V, I, power and prints out cross section coordinates in PPM format for advanced field quality design.

Publications describing the code:
Internal notes, For technical info contact Ed Bush, MP 8 LANL, (505) 667 5988

Is code documentation available? [x] Yes, [ ] No

How may the code be obtained?
See Ann Aldridge

Source language: LISP

Computers it runs on: VAX or VMS with UNIX

It is available as: [x] Source code, [ ] Executable only

Source Media: [ ] Listing, [x] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format: [ ] Unformatted

Diskette size & format:

Available through: [x] DECNET, [ ] ARPANET, [ ] BITNET

Network Address
Date of Latest Version: May 1986

Person to Contact: Steve Peggs
Address: CERN MS 99 4040
           CERN
           CH-1211
           Geneva 23
           Switzerland

Telephone Number: 41 12 76 36 72, 76 36 73, 76 36 74, 76 36 75

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
Other: Beam Beam Interaction

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
EVOL is a tracking program that includes sextupoles, multiple beam-beam collisions, external tune modulation, and other effects. Its construction emphasizes operational speed and the ease of scanning of two or three configuration variables, such as beta function, amplitude and chromaticity, at the expense of simplification in the physical model.

EVOL was originally written at CERN to simulate non-linearities in the SPS collider. It is now being used and developed further, in round and flat beam versions, at the Cornell Electron Storage Ring (CESR). Single particles are tracked for many turns, for example 10^4, around a non-linear lattice in the presence of a set of physical effects chosen by the user from a "library." These effects interact with each other strongly or weakly, in ways that are theoretically understood to a greater or lesser degree.

Publications describing the code:

Is code documentation available?  Yes  No

How may the code be obtained?
- Contact Steve Peggs

Source Language: FORTRAN 77

Computers it runs on: VAX VAX-11/750 IBM

It is available as: Source code, Executable only

Other Media: Listing, Tape, Diskette, Cards, Networks

Tape format: Whatever
Diskette format: Whatever
Available through: DECNET, ARPA-NET, BBN-NET

Network Address:
Date of Latest Version: 1980

Person to Contact: I. A. H. S.
Address: FFR Theory Group
CERN
CH-1211 Geneva 23
watermark

Telephone Number: 33 38 37

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other

Short Description: Purpose, capabilities, algorithms, special features, etc.

2nd order Finite Element

Publications describing the code:

Yes

Is code documentation available? Yes No

How may the code be obtained?

Obsolete

Source Language:

Computers it runs on

It is available as:

Source code

Executable only

Available through

DECFNET
ARPANET
BIFNET

Note: Address, phone number
Date of Latest Version: Dec 1986

Person to Contact: Alex I. Drag
Address: Dept. of Physics
University of Maryland
College Park, MD 20742
USA

Telephone Number: 301-454-5421

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
Analysis:
Stability, Impedances

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
GENMAP 4.0 is a program to compute numerically transfer maps through third order for arbitrary
beamline elements using the algebraic method. The code uses canonical variables (E, p_x, p_y, L, p_z) to
study a particular beam element or transport system, the user must modify a subroutine to specify the
Hamiltonian as a power series around the design trajectory. This involves specifying the electromagnetic
fields in question (and various derivatives) by analytic approximations or interpolation tables. The
output of GENMAP is the Lie algebraic transfer map for the system under study. GENMAP is generally
used to compute transfer maps for beamline elements with fringe fields. These maps can be utilized by
MARYIF 4.0 for tracking and analysis of transport systems with realistic fringe fields. GENMAP can
also be incorporated as a subroutine in MARYIF 4.0 for optimization of systems with fringe fields

Publications describing the code:
Labs, internal report A5 69-86-214 (June 1986)

R. R. Yune, "Numerical Computation of the Transfer Map for a Magnetic Dipole with Mid Plane Symmetry
using the Algebraic Method," Los Alamos National Labs, internal report A5 69-86-23 (August
1986)

A. Drag et al., MARYIF 4.0: A Program for Charged Particle Beam Transport Based on Lie Algebraic

More documentation available? Yes/No

How can the code be obtained?
A copy may be obtained at Los Alamos National Laboratory
A copy may be obtained at the Center for Advanced Particle Accelerator Concepts
A copy may be obtained at the University of Maryland
The code may also be obtained from the

Internet Accessible Information: Contact Alex I. Drag at College Park, MD
(301) 454-5421
Source language: FORTRAN 77

Computers it runs on: Any supporting FORTRAN 77

It is available as: x Source code, x Executable only

Source Media: x Listing, x Tape, x Diskette, x Cards, x Networks

Lape format:

Diskette size & format:

Available through: DECNET, ARPANET, BITNET

Network Address: likewhathappens
Date of Latest Version: unknown  
Program Name: GIANT

Person to Contact: Hamad Shonee  
Address: Stanford Linear Accelerator Center  
P.O. Box 4349, SLAC Bin 28  
Stanford, CA 94305  
USA

Telephone Number

Classification of Computer Code:  
Component Design:  
- Ion Source  
- Magnet  
- RF cavity
Accelerator Optimization:  
- Linac  
- Cyclotron  
- Synchrotron
Tracking or Simulation:  
- Linac  
- Cyclotron  
- Synchrotron
Analysis:  
- Stability  
- Impedances
Other: Control Program

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Many model-driven diagnostic and correction procedures have been developed at SLAC for the on-line computer controlled operation of SPEAR, PEP, the LINAC, and the Electron Damping Ring. In order to facilitate future applications and enhancements, these procedures are being collected into a single program, GIANT. The program allows interactive diagnosis as well as performance optimization of any beam transport line or circular machine. The test systems for GIANT are those of the SLC projects.

Publications describing the code:

Is code documentation available?  
- Yes  
- No

How may the code be obtained?  
- Unknown

Source Language: FORTRAN 77

Computers it runs on

It is available as:  
- Source code  
- Executable only

Source Media:  
- Listing  
- Tape  
- Diskette  
- Cards  
- Networks

Tape format:  
- Diskette case & format

Available through:  
- DISTNET  
- ARPANET  
- BITNET

Network Address:  
-  
-  
-
Date of Latest Version: 1986

Program Name: GOS

Person to Contact: H. Wollnik
Address: H. Physical Institute
         Heinrich Börling 14-16
         D-3000 Gießen,
         Fed. Rep. Germany

Telephone Number: 0641 702 2770

Classification of Computer Code:
  Component Design:
    -- Ion Source, -- Magnet, -- RF cavity, --
  Accelerator Optimization:
    -- Linac, + Cyclotron, + Synchrotron,
    --
  Tracking or Simulation:
    -- Linac, -- Cyclotron, -- Synchrotron,
    --
  Analysis:
    -- Stability, -- Impedances, --
  Other: Design of Mass Spectrometers and electromagnetic transport lines

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
  Third order matrix method, usual beam line elements + fringe field approximation, fitting capabilities, space charge approximation.

Publications describing the code:
  BNM (To be published)
  (GSI Report THD 26 Darmstadt (1984))

Is code documentation available? -- Yes -- No

How may the code be obtained?
  Contact above address

Source language: Fortran

Computers it runs on: VAX, Cyber.

It is available as: -- Source code, -- Executable only

Source Media: -- Lasting, + Tape, -- Diskette, -- Cards, -- Networks
  Tape format as desired
  Diskette size A format as desired

Available through: DECNET, ARPANET, BITNET

Network Address: use field above internet.
Date of Latest Version: unknown

Person to Contact: Bland Shores
Address: SLAC
P.O. BOX 4340, SLAC Bldg 26
Stanford, CA 94305
USA

Telephone Number: (415) 494-3300 ext. 2954, FTS 461-9300 ext. 2954

Classification of Computer Code:

Component Design:
- Ion Source, ☑ Magnet, ☑ RF-cavity, ☑

Accelerator Optimization:
- Linac, ☑ Cyclotron, ☑ Synchrotron, ☑

Tracking or Simulation:
- Linac, ☑ Cyclotron, ☑ Synchrotron, ☑

Analysis:
- Stability, ☑ Impedances, ☑

Other: An executive program

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

GO is an executive program placed on the PEP group's public disk (PUBPL 192) to facilitate the use of several PEP related computer programs available on VM. The exec's program list currently includes: CELL, COLLIDER, MAGIC, PATRICIA, PETROS, TRANSPORT, and TURTLE. In addition, provisions have been made to allow addition of new programs to this list as they become available. The GO exec is directly callable from inside the Welbur editor (in fact, currently this is the only way to use the GO exec). It provides the option of running any of the above programs in either interactive or batch mode. In the batch mode, the GO exec sends the data in the Welbur active file along with the information required to run the job to the batch monitor (BMON a virtual machine that schedules and controls execution of batch jobs). This enables the user to proceed with other VM activities at his/her terminal while the job executes, thus making it of particular interest to the users with jobs requiring much CPU time to execute and/or those wishing to run multiple jobs independently. In the interactive mode, useful for small jobs requiring less CPU time, the job is executed by the user's own Virtual Machine using the data in the active file as input. At the termination of an interactive job, the GO exec facilitates examination of the output by placing it in the Welbur active file.

Publications describing the code:

- Shores, B. - GO an Exec for Running the Programs: CELL, COLLIDER, MAGIC, PATRICIA, PETROS, TRANSPORT And TURTLE. SLAC internal report No. PEP NOTE 360 (1982) 8p

Is code documentation available? ☑ Yes ☑ No

How may the code be obtained?

Source Language:
Computers it runs on:
It is available as: ☑ Source code, ☑ Executable only

Source Media: Listing, Tape, Diskette, Card, Network
- Tape format
- Diskette size A format

Available through: DECNET, ARPANET, BITNET

Network Address
Date of Latest Version: unknown

Program Name: content

Person to Contact: C. Kost
Address: TRIUMPH, Univ. B.C.
1004 Westbrook Mall
Vancouver, B.C.
Canada V6T 1Z1

Telephone Number: 604 222 1047 ext 310

Classification of Computer Code:
Component Design:
  ☐ Ion Source. ☐ Magnet. ☐ RF cavity. ☐
Accelerator Optimization:
Tracking or Simulation:
Analysis:
  ☐ Stability. ☐ Impedances. ☐
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
  None available

Publications describing the code:
  None available

Is code documentation available? ☐ Yes ☐ No

How may the code be obtained?
  This code is not "portable" to any other institution

Source language:
Computers it runs on:
It is available as: ☐ Source code. ☐ Executable only
  Tape format:
  Diskette size & format:
Available through: ☐ DECNET. ☐ ARPANET. ☐ BITNET

Network Address:
Program Name: GOCCD

Date of Latest Version: unknown

Person to Contact: A.C. Paul
Address: MS L-628
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: 415-423-3183, FTS 543 3183

Classification of Computer Code:
Component Design:
- Ion Source.
- Magnet.
- RF cavity.

Accelerator Optimization:
- Linac.
- Cyclotron.
- Synchrotron.

Tracking or Simulation:
- Linac.
- Cyclotron.
- Synchrotron.
- General Magnetic Field

Analysis:
- Stability.
- Impedances.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

GOCCD is a general orbit code incorporating a flexible selection of magnetic field input geometries encountered in polar accelerator design. The code calculates the field as the sum of fields obtained from up to two independent field array. The main field array can be either radial (1-dimensional), median plane polar (2-dimensional) non-median plane (two-dimensional r, z, input of H, and B, or three-dimensional with input of H, B, and B,). For median plane expansion the code is accurate to 1%. The code takes as the independent variable and will trace rays, track phase space, or determine equilibrium orbit properties of the magnetic field.

Publications describing the code:
- Known

Is code documentation available? Yes

How may the code be obtained? Known

Source Language:

Computer it runs on:

It is available as: Source code, Executable only

Source Media: "Existing" Tape, "Diskette, "Cards, "Networks

Tape format: Diskette, Card & format

Available through: DECNET, ARPANET, BITNET

Network Address:
Program Name: HARMON

Date of Latest Version: Oct 1985

Person to Contact: Marion Donald
Address: SLAC
P.O. Box 1340
Stanford, CA 94305
USA

Telephone Number: 415-947-3300, ext 3205

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other: Beam Line Optimizer

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Purpose: To optimize the strength of sextupole correction magnets to improve beam dynamics

Algorithms: Least Squares minimization of a set of nonlinear functions including tune shift versus momentum, tune shift versus amplitude and distortion of phase space

A new version will be released with the data based version of MAD

This version will have data input closely resembling that of MAD

The code at present will only handle closed machines. It is hoped to extend it to handle beam lines as well

Publications describing the code:


Is code documentation available? Yes No

How was the code obtained?
- Code is a module of the program MAD by L. Enjalbert & R.G.
- Code is presently only documented by publications above

Source Language: FORTRAN

Computer environments: IBM FORTRAN

Is code available as: Source code Execute only
Source Media: Listing, Tape, Diskette, Cards, Networks
Tape format: ASCII, EBCDIC
Diskette size & format:
Available through: DECNET, ARPANET, BITNET

Network Address: MHD@SLACNET, MHD@SLACPC (BITNET) PER MHD@DECNET
Person to Contact: Masaharu Hara
Address: Cyclotron Laboratory
RIKEN (The Institute of Physical and Chemical Research)
WAKO, SAITAMA 351-01
Japan

Telephone Number: 0184 311 Text 1011

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linear, Cyclotron, Synchrotron
Tracking or Simulation:
- Linear, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: To calculate resonant frequencies, electric lines of force, magnetic lines of force, electric fields, and magnetic field for axisymmetric modes (TM or TE) based on finite element method

Publications describing the code:

Is code documentation available? Yes

How may the code be obtained?
- Contact author

Source language: FORTRAN 77

Computers it runs on: FACOM M380

It is available as:
- Source code
- Executable only

Source Media:
- Listing, Tape, Diskette, Cards, Networks
- Tape format, 8 track, 1600 bps
- Diskette size & format

Available through:
- DECNET, ARPANET, MILNET

Network Address:
Date of Latest Version: Jan, 1984

Person to Contact: Masahiro Hara
Address: Cyclotron Laboratory
Riken (The Institute of Physical and Chemical Research)
WAKO, SAITAMA, 351-01.
Japan

Telephone Number: 0434-62-1411 ext 401

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity,
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron,
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron,
Analysis:
- Stability, Impedances,
Other:

Short Description: [Purpose, capabilities, algorithms, special features, etc.]
To calculate cut-off frequencies, electric lines of force, and magnetic lines of force for waveguide with arbitrary cross section. Mesh generator and graphic display codes are included. Based on finite element method.

Publications describing the code:

Is code documentation available? Yes 

How may the code be obtained?
Contact author

Source Language: FORTRAN 77

Computers it runs on: FACOM M380

It is available as: Source code, Executable only
Source Media: Testing, Tape, Diskette, Cards, Networks
File Format: Shell, machine
Diskette size & format:
Available through DECNET, ARPA NET, BITNET

Network Address:
I'll give a brief description of the code and its capabilities, algorithms, and special features.

Transport of nucleons, pions, and muons in general 3D geometry. Interaction physics by Bertini intra-nucleon cascade model with evaporation model. Complete code or MCNP for transport of low energy neutrons and photons.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
Source code, executable, and user manual available from Radiation Shielding Information Center (RSIC). Los Alamos version available upon special request from RF Pradl.

Source language: FORTRAN

Computer runs on: IBM 360 and CRAY

Source code, executable only

Source code, Testing, Tape, Diskette, Cards, Network

Diskette or A format

Available versions: PDEC4 ARPANET RTMS4

For technical help:
I'llglillll \,,,,,r. .
[Image 0x0 to 659x819]

Date of Latest Version: unknown

Program Name: HOPL

Person to Contact: T. T. de Mene
Address: Brookhaven National Laboratory
        Upton, L.I., NY 11973
        U.S.A.

Telephone Number:

Classification of Computer Code:

Component Design:
   Ion Source, "Magnet, "RF cavity, "
Accelerator Optimization:
   Linac, "Cyclotron, "Synchrotron, "
Tracking or Simulation:
   Linac, "Cyclotron, "Synchrotron, "
Analysis:
   Stability, "Impedances, "
Other: Control

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

HOPL, an on-line computer program written on the PDP 10, matches the beam from the 300 MeV linac to the AGS without the necessity of making emittance measurements. It performs the matching by modifying independently the horizontal and vertical emittance. Experimental results show success with this method, which can be applied to any matching section.

Publications describing the code:

T. de Mene 11-1 "HOPL: On-line Injection Optimization Program." Brookhaven National Laboratory internal report no. 1951, 5071 (1975) 40p

Is code documentation available? Yes No

How may the code be obtained?

Source language

Computer it runs on: PDP 10

It is available as:
   Source code, Executable only

source format
   Listing, Tape, Diskette, Cards, Networks

Executable format
   Diskette, tape & format

Available through:
   DEFNET, ARPANET, BBN

Network Addres
Date of Latest Version: June 1986

Person to Contact: Michael F. Jones
Address: MS 1822A, group A-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505 667 5500 FTIS 841 7560

Classification of Computer Code:
Component Design:
Ion Source, Magnet, RF cavity,
Accelerator Optimization:
Linac, Cyclotron, Synchrotron,
Tracking or Simulation:
Linac, Cyclotron, Synchrotron,
Analysis:
Stability, Impedances,
Other: Modeling of intense charged particle beams

Short Description: Purpose, capabilities, algorithms, special features, etc.
FTIS is a fully relativistic PIC code that can handle time dependent electromagnetic fields. It has been applied to wakefield problems in plasmas and photocathode electron source design for EELs. There are a wide variety of options, including 1-dimensional and 2-dimensional geometry, cylindrical and Cartesian coordinates, multiple internal boundary, emission and particle creation, and optimization on CRAY computers

Publications describing the code:
None

Code documentation available: Yes / No

How may the code be obtained:
Contact M. Jones. Note: This code is not easily transportable because it has been optimized for the Los Alamos CRAY

Source Language: CFTIS, FORTRAN

Computer it runs on: CRAY or IBM

Program available as: Source code, Executable only

source: Teletype, List tape, Diskette

User interface: Network

available through: DECNET ARPANET BITNET

Network Address
Classification of Computer Code:
Component Design:
Ion Source, Magnet, RF cavity,
Accelerator Optimization:
Linear, Cyclotron, Synchrotron,
Tracking or Simulation:
Linear, Cyclotron, Synchrotron,
Analysis:
Stability, Impedances,
Other: Charged Particle Transport Code

Short Description: Purpose, capabilities, algorithms, special features, etc.
Electromagnetic Monte Carlo transport code. 8 US actually a system of eight codes: HIGER, HIGERF, CTRAX, CTRAXP, CTRAXM, ACCEPT, ACCEPTF, and ACCEPTM. Special features include:
1) Generalized 2-D and 3-D analytic geometry
2) Complete particle cascade
3) External EM fields
4) Geodesy A transition radiation
5) Well vetted by experiment

These codes have been used to simulate the interaction of electron beams generated by pulsed power accelerators with many target materials. They are based on the HIGER system, which was developed for an energy range from 10 keV to a few tens of MeV. Modifications have extended their applicability up to 100 MeV and theories used in the code are equivalent to those employed in the ADEPT code.

For more information:
2) F. M. Court: A Multifield Benchmark Report ALCHEM 72 (1972)
3) F. M. Court: benchmark Monte Carlo Benchmark Calculations-Linear Detectors, Lawrence Livermore Laboratories, Livermore, California (1973)
4) F. M. Court: A Multifield Benchmark Report ALCHEM 72 (1972)
5) F. M. Court: An Improved Monte Carlo Benchmark Calculation for Electron and Photon Interaction with Dense Materials, Lawrence Livermore Laboratories, Livermore, California (1973)
Is code documentation available?  **Yes  No**

How may the code be obtained?

Contact Groups X-8 at Los Alamos or L.A. Haibide at Sandia National Laboratory, Org 1231, Building 3400
Albuquerque, NM 87123, telephone (505) 844-1575 or FTS 684-1575.

Source language: FORTRAN 77

Computers it runs on: CRAY, VAX, CDC 7600, IBM

It is available as: **Source code, Executable only**

Source Media: **Listing, Tape, Diskette, Cards, Networks**
Tape format: VAX BACKUP
Diskette size & format:

Available through: DECNET, ARPANET, BITNET

Network Address:
I);11,.

1.1

I',.rwll,

Classification of Computer Code:

Component Design:

- Ion Source
- RF cavity
- Electrostatics

Accelerator Optimization:

- LINAC
- Cyclotron
- Synchrotron

Tracking or Simulation:

- LINAC
- Cyclotron
- Synchrotron

Analysis:

- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

JASON solves general electrostatics problems having either slab or cylindrical symmetry. More specifically, it solves the self-adjoint elliptic equation: \( \nabla \cdot (K \nabla V) + \rho = 0 \) in an arbitrary two-dimensional domain. For electrostatics, \( V \) is the electrostatic potential, \( K \) is the dielectric tensor, and \( \rho \) is the free charge density. The parameter \( K \) is identically zero for electrostatics but may have a positive non-zero value in other cases (e.g., capillary surface problems with gravity loading). The system of algebraic equations solved by JASON is generated by the finite element method. Four-node quadrilateral elements are used for most of the mesh. Triangular elements, however, are occasionally used on boundaries to avoid severe mesh distortions.

Publications describing the code:


Is code documentation available? **Yes**  **No**

How may the code be obtained? **Yes**

Compiler Language

Compiler

Platform as source code

Executable code

Source code on tape, diskette, card, network.

Encapsulated

Executable

Auto-ran as stand-alone

A platform: IBM 3040, IBM 3800, powered by

x

Yes

No
Classification of Computer Code:
Component Design:
  Ion Source, Magnet, RF cavity.
Accelerator Optimization:
  Linac, Cyclotron, Synchrotron.
Tracking or Simulation:
  Linac, Cyclotron, Synchrotron.
Analysis:
  Stability, Impedances.
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Find the resonant frequencies, the field pattern and the longitudinal loss factors for asymmetric waveguide modes propagated at v/c in disk-loaded waveguide by field matching using matrix techniques.

Publications describing the code:

Code documentation available? Yes No

How may the code be obtained?
  Contact F. Keal

Source Language: FORTRAN 5

Compilers it runs on: CUB

Input/Output: Source code. Executable only.

Source code: Tapes, Diskette, Cards, Network.
Tape format: Binary
Diskette format: Binary

Available under: DEFN 41, ARPANET, IBM/360

Written in: Ada, Fortran 77, Fortran 5
Date of Latest Version: 1986

Person to Contact: P. Spadlak
Address: GSI-DARMSTADT
Postfach 11 95 41
64200 DARMSTADT
Fed. Rep. Germany

Telephone Number: 4471 359-323

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity, \( \times \) low energy (DC) beam.

Accelerator Optimization:
- Linac, Cyclotron, Synchrotron.

Tracking or Simulation:
- Linac, Cyclotron, Synchrotron.

Analysis:
- Stability, Impedances.

Other: Transport space charge effects.

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Kode zur Berechnung Raumladungsorteter Teilchenbahnen im Linac.

KOBRA3 calculates the trajectories of charged particles in static electro-magnetic fields in three dimensions, including extraction problems. The electric field is determined by the potential distribution from a given electrode arrangement. Space charge is taken into account by an iterative process. The self-consistent formation of the plasma meniscus can be calculated. The magnetic field distribution is either analytically determined or read in from a table. Six types of distribution are offered. The potential fields of any plane may be displayed as equipotential line drawings or by 3D-diagrams, in which the potential is represented as the third coordinate. The calculated particle trajectories can be displayed by emission diagrams, represented in two dimensions by projection onto any plane, or as three-dimensional diagrams.

KOBRA is partitioned into eight programs, KOBRA, KOBRA2, KOBRA3, KOBRA4, KOBRA5, KOBRA6, KOBRA7, and KOBRA8, which display the results.

Publications describing the code:
- 1984, 32, 692-696

Examples in Proceedings of Linac Conference,zechern 1984, GSI Darmstadt internal report k. 10-84-11-11 (conference index under Spadlak)

Is code documentation available?  Yes, No

How may the code be obtained?
Implementation in request
Source language: ALGOL

Computers/ systems: IBM VAX

It is available as: Source, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Tape format:
Diskette size & format:

Available through: DECNET, CARPANET, BITNET

Network Address: T03DDACGSI3 BITNET
Person to contact: A. Konrad
Address: General Electric Corporate Research and Development
Building 37, Room 65
Schenectady, NY 12301
USA

Telephone Number: 418-187 5084

Classification of Computer Code:
Component Design:
Ion Source, Magnet, RF cavity.
Accelerator Optimization:
Linac, Cyclotron, Synchrotron.
Tracking or Simulation:
Linac, Cyclotron, Synchrotron.
Analysis:
Stability, Impedances.
Other:

Short Description: A purpose, capabilities, algorithms, special features, etc.

Linear Accelerator Cavity Code solves the classical electromagnetic field problem of the empty axially symmetric resonator with conducting walls. The program algorithm is based on a variational formulation coupled with the high order polynomial, triangular finite element method for the magnetic field calculation. Various other numerical methods such as one and two-dimensional Newton-Cotes integration are used to obtain the performance measuring quantities (e.g. transit time factor, stored energy, power loss, shunt impedance, Q-factor). This is a modification of a 1973 program called AXISYM VECTOR HELMHOLTZ FINITE.

Publications describing the code:

A. Konrad: "A Linear Accelerator Cavity Field Calculation by the Finite Element Method" NPE Trans. v 20 (1973) 902-908


Is code documentation available? Yes No

How may the code be obtained?

Source Language FORTRAN

Computer system IBM 360, 370

Executable only

Source Code

Date of Latest Version: 1.7.7
Program Name:  

Date of Latest Version: 1.7.7
Date of Latest Update: unknown

Person to contact: P. Fernandes
Address: Istituto per la Matematica Applicata
        CNR
        Genova
        Italy

Telephone Number:

Classification of Computer Code:
Component Design:
  Ion Source, Magnet, RF cavity
Accelerator Optimization:
  Linear, Cyclotron, Synchrotron
Tracking or Simulation:
  Linear, Cyclotron, Synchrotron
Analysis:
  Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.):

```
LAMAGF is an improved version of the LAMA program to compute resonant frequencies and fields for all the modes of the lowest TMq band pass of multicell structures
```

Publications describing the code:

P. Fernandes & Parish "LAMAGF: A Computer Program to Calculate the TMq Modes of Linearly Symmetrical Multicell Resonant Structures / Part I" A.1982.1155

Is code documentation available? Yes  No

How may the code be obtained? 
unknown

Source language

Computers it runs on

Available as: Source code, Executable only

Source Media:
  Printing, Tape, Diskette, Cards, Networks

Language Format:
  Fortran

Detailed user manual Format

Available through:
  DECNET, ARPANET, BBNNET

Network Address
Date of Latest Version: unknown

Person to Contact: V. M. Bond
Address: I.S.S.R. Academy of Sciences
           Siberian Division
           Institute of Nuclear Physics
           Novosibirsk, 630090
           U.S.S.R.

Telephone Number:

Classification of Computer Code:
Component Design:
  * Ion Source, * Magnet, * RF cavity, *
Accelerator Optimization:
  * Linac, * Cyclotron, * Synchrotron, *
Tracking or Simulation:
  * Linac, * Cyclotron, * Synchrotron, *
Analysis:
  * Stability, * Impedances, *
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
LANS is a code developed for calculation of axysymmetrical cavities. The mathematical basis of this
code is the method of inverse iterations with a shift, which is the most adequate for the problem of
finding the eigenfrequencies and fields for the cavities. This code has some advantages compared with
SUPERFISH, it requires a smaller number of operations necessary for calculations and it gives better
resolution of resonance modes with close frequencies.

Publications describing the code:
B. M. Bond, V. P. Jackowlev, M. M. Khlopin, P. B. Usyansik, "LANS - A New Code for Evaluation
of the Electromagnetic Fields and Resonance Frequencies of Axysymmetrical RF Cavities," Part Ac-

Is code documentation available?    Yes    No

How may the code be obtained?
unknown

Source language
Computers it runs on
It is available as: Source code, Executable only
Tape format:
Diskette size & format
Available through: * DEFNET, * ARPANET, * BITNET

Network Address:
Program Name: LATTICE

Date of Latest Version: unknown

Person to Contact: John Staples

Address: Lawrence Berkeley Laboratory

Bldg. 84, Room 221A

1 Cyclotron Rd.

Berkeley, CA 94720

Telephone Number:

Classification of Computer Code:
Component Design:

- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:

- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:

- Linac
- Cyclotron
- Synchrotron

Analysis:

- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LATTICE is a computer code which enables an interactive user to calculate the functions of a synchrotron lattice. This program satisfies the requirements at LBL for a simple interactive lattice program by borrowing ideas from both TRANSPORT and SYNCH. A fitting routine is included.

A version of LATTICE exists that is written in BASIC and runs on HP 9845.

John Staples and Arthur C. Paul have divergent versions in Pascal which run on the IBM PC. The latter version is self-booting with complete on-line documentation. Address: Arthur C. Paul, MS L 626, Lawrence Livermore National Laboratory, P.O. Box 806, Livermore, CA 94550.

Publications describing the code:

John Staples, "LATTICE: An interactive lattice computer code," LBL internal report no. LBL 4914. CP 76/48p

Is code documentation available? [x] Yes  [ ] No

How may the code be obtained?

Contact: John Staples

Source Language: FORTRAN

Computer System: CDC 6600

It is available as:

- Source code
- Executable only

Source Media: [ ] Tape  [ ] Diskette  [ ] Cards  [ ] Networks

Tape format

Diskette size & format

Available through [ ] DECNET  [ ] ARPANET  [ ] BITNET

Network Address:
Date of Latest Version: July 1986

Person to Contact: Etienne Forest
Address: MS 80 4400
URA Design Center
c/o UCRL
Berkeley, CA 94720
USA
Telephone Number: (415) 496 6580 or ETS 454 6580

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linear
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linear
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
LEAPOT generates a Lie algebraic map that produces tracking results equivalent those produced by the code LEAPOT. This allows the user to interface with the code MARYLE and hence calculate auxiliary quantities such as chromaticity and nonlinear invariants. The results are equivalent to six third order transport matrices.

Publications describing the code:
E. Forest, "Lie Algebraic Maps and Invariants Produced by Tracking Codes," SSC Design Group internal report no. 784 (1986)

Is code documentation available? *: Yes *: No

How may the code be obtained?
Contact Etienne Forest

Source Language: FORTRAN 77

Computer it runs on: CRAY XMP/VAX

It runs as: : Source code

Source Media:
: Tape
: Diskette
: Cards
: Networks
Tape format: Executed
Diskette size: Executed

Available through:
DEFNET
ARPANET
BITNET

Network Address:
Classification of Computer Code:
Component Design:
Ion Source, Magnet, RF cavity.
Accelerator Optimization:
Linac, Cyclotron, Synchrotron.
Tracking or Simulation:
Linac, Cyclotron, Synchrotron.
Analysis:
Stability, Impedances.
Other:

Short Description: A fast and flexible many particle tracking code in transverse and longitudinal phase space using matrix formalism and lumped linear or non-linear perturbations with systematic, harmonic or random azimuthal distributions. In particular it is useful for studies of non-linear resonances, etc.

Publications describing the code:

Is code documentation available? Yes

How may the code be obtained?
From author

Source Language: FORTRAN

computer it runs on: IBM

Available as: Source code, Executable only.

Source Code: Listing, Tape, Diskette, Card, Network

Network Available: DECNET, ARPA, IBM, LI}

Network Available:
Date of Latest Version: 1979

Person to Contact: Stanley Snowden
Address: FNAL
P.O. Box 500
Batavia, IL 60510
USA

Telephone Number: (312) 340-3004, FTS 370-3004

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

LINDA uses a combination of scalar and vector potentials to model 2-D magnetostatic problems. The code is very accurate and can handle up to 30,000 mesh points. Will handle iron with nonuniform permeability. Main limitation is that there can be only one region of iron in the problem. Input is much simpler than that for POISSON

Publications describing the code:
  49-62

Is code documentation available? Yes No

How may the code be obtained?
Contact: stan snowden

Source language: FORTRAN

Computers it runs on: IBM 360, 75, CDC6600

It is available as:
- Source code, Executable only

Source Medium: Listing, Tape, Diskette, Cards, Networks
- Tape format
- Diskette size & format

Available through: DECNET, ARPANET, BBNET

Network Address:
Date of Latest Version: 08/1

Program Name: LOOPER

Person to Contact: G. Schuler
Address: A1 Division MS 1861
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 466-5634, FTS 861-5634

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program LOOPER calculates the rf characteristics as seen by the drive and or component elements of coupled rf resonators using coupled RLC circuit theory. Input of cavity Q and impedance permits calculation of power losses and average on-axis fields that agree very well with multiecell SUPERFISH calculations. The program handles all resonance characteristics, all passband modes, beam loading, multi-cell neighbor coupling, each element different, stability, and bridges between elements.

Publications describing the code:
Some

Is code documentation available? Yes

How may the code be obtained:
From the author: E. Fiebig, Inst. fur Kernphysik, Universitat Mainz, Postfach 300 0319
Mainz, RFT 85, Germany.
RFF National Laboratory for High Energy Physics, Otomo Machi, Tsukuba
Ibaraki Ken, JAPAN 305-01

Source Language: FORTRAN

Computer it runs on: CDC CYBER

It is available as:
- Source code
- Executable only

Source Media:
- Listing
- Tape
- Diskette
- Cards
- Networks

Link Format:
- Diskette
- Tape

Available through:
- DECNET
- ARPANET
- BITNET

Network Address:
LFRACK is a first-order matrix, beam transport code that takes into account the longitudinal wake field of the monopole and quadrupole modes and the transverse wake force of the dipole and quadrupole modes. Provision is made for error analysis, including orbit correction. It has been used in the study of wake effects in the Stanford Linear Collider (SLC) and in the Los Alamos Free Electron Laser Energy Recovery Experiment (FLAREX). The present version is very similar to that developed at SLAC by Karl Ramey except that bending magnet and edge rotation has been added. A user's package with explanations for code installation has been prepared.

Publications describing the code:

Is a code documentation available?  Yes  No

How may the code be obtained?
Contact Y. Elaine Chan of the Los Alamos Accelerator Code Group by calling Helen E. Stokes at 7121-4831 or 7121-4830.

source language: FORTRAN

Compiler it runs on: NO

source available as: Source code. Executable only


Transferred from: Teletype II. Card

Available through: DRL Y. ARPA Y. MAD Y. N

Network Access: Bitnet nps
Person to Contact: C. Iselin
Address: LEP Theory Group
          CERN
          CH-1211 Geneva 23
          Switzerland
Telephone Number: +41 22 763 3657

Classification of Computer Code:
  Component Design:
    - Ion Source
    - Magnet
    - RF cavity
  Accelerator Optimization:
    - Linac
    - Cyclotron
    - Synchrotron
  Tracking or Simulation:
    - Linac
    - Cyclotron
    - Synchrotron
  Analysis:
    - Stability
    - Impedances
  Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
  Programming system with a common data base for optics and design. Includes survey, linear lattice, matching, tracking

Publications describing the code:
  C. Iselin, "The MAD Program," CERN LEP TH 85-15

Is code documentation available? Yes No

How may the code be obtained?
  Tape or Network

Source language: FORTRAN 77

Computers it runs on: IBM, DEC, VAX, VAX

It is available as: Source code, Executable only
  Source Media: Listing, Tape, Diskette, Cards, Network
  Tape format: 9 track 1600 bps
  Diskette size: 80 track

Available through: DÉCNET, ARPANET, VAX Net

Network Address: DECNET
Date of Latest Version: 1987

Program Name: MADEST

Person to Contact: K. M. Thompson
Address: Argonne National Laboratory
9700 S. Cass Ave., Bldg. 300
Argonne, IL 60439
USA

Telephone Number: (630) 252-8285 or FTS 272-8285

Classification of Computer Code:

Component Design:
- Ion Source, Magnet, RF cavity

Accelerator Optimization:
- Linac, Cyclotron, Synchrotron

Tracking or Simulation:
- Linac, Cyclotron, Synchrotron

Analysis:
- Stability, Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MADEST is an interactive program used to develop the geometrical designs for the cores and conventional coils of various types of magnets. It does NOT involve magnetic field calculations. From the designs made by MADEST can be used to develop cost estimates for designing, fabricating, and installing systems of magnets. The code is under development.

Publications describing the code:


Is code documentation available? Yes ☑ No ☐

How may the code be obtained?

Contact K. M. Thompson

Source Language: The FORTRAN version is still under development, also Hewlett-Packard BASIC

Computers it runs on: VAX, HP9845, HP200, and HP300

It is available as: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks
Tape format: Diskette size & format:

Available through: DELNET, ARPANET, RENET

Network Address:
Date of Latest Version: unknown

Person to Contact: J C Brown
Address: MS 1561
Lawrence Livermore National Laboratory
P.O. Box 808
Livermore, CA 94550

Telephone Number: (415) 423-4157

Classification of Computer Code:
Component Design:
- Ion Source, □ Magnet, □ RF-cavity, □

Accelerator Optimization:
□ LINAC, □ CYCLOTRON, □ SYNCHROTRON

Tracking or Simulation:
□ LINAC, □ CYCLOTRON, □ SYNCHROTRON

Analysis:
□ Stability, □ Impedances, □

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Program MAFCO is capable of calculating the magnetic fields resulting from a given set of current-carrying conductors of arbitrary two- or three-dimensional geometry, in which no permeable material is present. The elements which comprise the generalized coil geometry are:

1. Circular loops with designated position and orientation in space
2. Circular arcs with designated position and orientation in space
3. Helices along the z-axis (in the cylindrical coordinate system) with any designated pitch, starting point, and ending point
4. Straight lines with any arbitrary orientation
5. General elements specified by a list of points which the program connects with straight lines

All of these elements are assumed to be infinitely thin.

Arthur C. Paolucci (see TRANSPORT for address) has a Pascal version which runs on the IBM PC.

Publications describing the code:


Is code documentation available? Yes □ No □
How may the code be obtained?

unknown

Source language: FORTRAN

Computers it runs on: CDC 6600 7300

It is available as: ☐ Source code. ☐ Executable only


Tape format:

Diskette size & format:

Available through: ☐ DECNET. ☐ ARPANET. ☐ BITNET

Network Address:
Program Name: MAFCOHII

Date of Latest Version: unknown

Person to Contact: S. J. Sackett
Address: MS L-122
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: 415-422-8709, FTS 532-8709

Classification of Computer Code:
Component Design:
- Ion Source, - Magnet, - RF cavity

Accelerator Optimization:
- Linac, - Cyclotron, - Synchrotron

Tracking or Simulation:
- Linac, - Cyclotron, - Synchrotron

Analysis:
- Stability, - Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program MAFCOHII is a combination of MAFCO and ZAM. MAFCO performs the calculation of the magnetic and/or electric fields resulting from the coil configuration specified, while ZAM performs the step-by-step solution of the system of first-order differential equations, by fourth-order Adams-Moulton predictor-corrector method, to obtain the particle trajectories desired. The program is extremely flexible, as evidenced by the generalized coil geometry that MAFCO accepts.

Publications describing the code:


Is code documentation available? - Yes - No

How may the code be obtained?
unknown

Source language: FORTRAN

Computers it runs on: unknown

It is available as: Source code - Executable only

Source Media: - Listing, - Tape, - Diskette, - Cards, - Networks

Tape format:
Diskette access format:

Available through: DECNET, ARPANET, BITNET

Network Address: unknown
Classification of Computer Code:

Component Design:
- Ion Source, ⊗ Magnet, ⊗ RF cavity.

Accelerator Optimization:
- Linac, ⊗ Cyclotron, ⊗ Synchrotron.

Tracking or Simulation:
- Linac, ⊗ Cyclotron, ⊗ Synchrotron.

Analysis:
- Stability, ⊗ Impedances.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MAFCO-W has been written for calculating magnetic fields of finite size conductors of general configuration which can be approximated by arc segments or straight segments of rectangular cross section. The magnetic field components were obtained by integrating the Biot-Savart law over the volume of the conductor. Their mathematical expressions were first reduced to single integration analytically and then integrated numerically. The magnetic fields for the conceptual Tokamak fusion reactors UWMAK-I and II were calculated and analyzed.

Publications describing the code:


Is code documentation available? ⊗ Yes ⊗ No

How may the code be obtained?

unknown

Source Language:

Computers it runs on:

It is available as: ⊗ Source code, ⊗ Executable only

Source Media: ⊗ Listing, ⊗ Tape, ⊗ Diskette, ⊗ Cards, ⊗ Networks

Tape format:

Diskette size & format:

Available through: ⊗ DECNET, ⊗ ARPANET, ⊗ BBNET

Network Address: unknown
Date of Latest Version: 4th 1986

Person to Contact: Thomas Weiland
Address: Deutches Elektronen Synchrotron (DESY)
Notkestrasse 85 d 2000
Hamburg 52
Federal Republic of Germany

Telephone Number: 040.886.4198

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Linear

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Resonance
- Wake field effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MAFIA is a collection of codes (M3, R3, E31, E32, P3 and T3) for calculating the resonant frequencies and transient electromagnetic fields in a fully 3 dimensional geometry. M3 is the mesh generator. R3 generates the eigenvalue matrix. E31 is a "standard" eigenvalue solver. E32 is an eigenvalue solver that uses multigrid methods. P3 is a postprocessor that displays a variety of one and two dimensional plots of the fields in the cavity and also prints a variety of numerical results.

T3 is a 3D version of THCL and is used for analyzing the electromagnetic interaction between bunched beams of charged particles and vacuum chambers containing cavities, bellows, etc. There are two postprocessors used with the code: W3COR subtracts the tube wake field from the total wake. W3FIT reads and prints a wake, it can calculate the gradient impedance, plot the bunch density, and normalize the wakes to 1.

Publications describing the code:

2. Weiland. Part A: C19841-245-91

Is code documentation available? Yes

How may the code be obtained?

The codes are available from T. Weiland in a "friendly user" basis. Executable formes are available on
Los Alamos National Laboratory computers. For more info contact Therese Harndt C19854-091-985.

The codes are also available on the MAF computer network for information of the MAF access contact
Therese Harndt C19854-091-985.

Source Language: FORTRAN
Computers it runs on: IBM 3681, DEC VAX

It is available as: ☐ Source code, ☐ Executable only

Source Media: ☑ Listing, ☐ Tape, ☑ Diskette, ☐ Cards, ☐ Networks
   Tape format: ☐ EBCDIC
   Diskette size & format:

Available through: ☑ DECNET, ☑ ARPANET, ☑ BITNET

Network Address: MPYWEI %OHIDESY3 BITNET
Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
MAGFOR calculates electromagnetic fields and forces in coil systems of arbitrary geometry. The code may be modeled by using 20-node isoparametric hexahedrons, 8-node rectangular cross-sectional straight segments, rectangular cross-sectional circular arcs, and/or filamenting circular loops. A combination of analytical and numerical integration of the Biot-Savart law for a volume distribution of current is used for calculating magnetic fields. Volumetric body forces are calculated for the 20-node isoparametric brick by numerically integrating the vector product J x B over its volume, where the magnetic field at each Gauss point is obtained by interpolating the magnetic field at the node points by using shape functions. The force is redistributed to the node points of the element, again using the shape functions in a consistent manner that maintains inter-element torsion. Body forces obtained from MAGFOR were compared with body forces from the computer code EFFI for several coil configurations considered in the design of the Advanced Test Reactor Facility (ATR).

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
Source Language:
Computer it runs on: Machine independent
It is available as: Source code, Executable only
Source Media: Listing, Tape, Diskette, Cards, Networks
Tape format:
Diskette disk A format
Available through: DEFNET, ARPANET, MCI/NET
Network Access: 1
Classification of Computer Code:
- Ion Source, x Magnet, RF cavity.

Accelerator Optimization:
- Linac, Cyclotron, Synchrotron.

Tracking or Simulation:
- Linac, Cyclotron, Synchrotron.

Analysis:
- Stability, Impedances.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Magnet Design in 2-dimensions: Finite Difference Method with two Potentials

Publications describing the code:
- CERN Program Library Writeup 1600

Is code documentation available? x Yes x No

How may the code be obtained?
(x Contact CERN Program Library)

Source language: FORTRAN 66

Computers it runs on: IBM CDC

It is available as: x Source code, x Executable only

Source Media: Listing, x Tape, x Diskette, Cards, x Networks
- Tape format: 9 track 1600 bpi
- Diskette size & format

Available through: DECNET, ARPANET, BITNET

Network Address:
Date of Latest Version: Oct 1986

Person to Contact: Sergo Passavant
Address: Texas Accelerator Center
2400 Timberloch Place
The Woodlands, TX 77380
USA

Telephone Number: (713)383-0121

Classification of Computer Code:

Component Design:

Ion Source, * Magnet, * RF cavity, *

Accelerator Optimization:

Linac, * Cyclotron, * Synchrotron, *

Tracking or Simulation:

Linac, * Cyclotron, * Synchrotron, *

Analysis:

Stability, * Impedances, *

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The MAGNUS package for 3-D magnetic field calculations consists of the preprocessor KUBIK, the MAGNUS solver, and the postprocessor EPLOG. The program employs the Finite Element Method (FEM), with a total scalar potential in regions with iron and a partial scalar potential in regions with current. The use of the total potential in iron avoids severe round off errors that would arise if a partial potential were used (small difference between large numbers). The program is interfaced with the international Graph Interface System (GIS).

The mesh generator KUBIK prompts the user to input all information describing the geometry of the problem and the desired mesh refinement. Names are assigned to regions or materials, boundaries, etc. KUBIK is a truly 3-D mesh generator. Modules representing simple bodies, or parts of bodies, are independently defined, each with its own mesh node. The modules are then assembled into the final mesh structure of any degree of complexity. KUBIK runs either interactively or in batch and accepts commands that print a variety of tables or plots.

KUBIK has a library of solid and filament conductor elements out of which the user can construct practically any shape in 3-D. Commands exist that will generate new conductors by deletion or rotation of existing conductors, or produce tables or plots. The independent program can be used to calculate the field of the conductors alone or of a boundary condition at any point in space. The conductors are completely independent of the mesh created by KUBIK and can be changed without modifying the mesh. MAGNUS also has a library of magnetization tables containing several American steels and Japanese steels at different temperatures and ideal materials such as pure iron or nickel. The user can input additional tables.

The MAGNUS solver obtains a solution in the mathematical sense: the magnetic potential given as a function of the coordinates at every point in the solution domain. A high efficiency and surprising short execution time is achieved by means of sophisticated programming and the use of sparse matrix techniques. The solver runs in batch for the number of iterations specified by the user until the desired accuracy is obtained. It generates a dipole field and can be restarted if desired.

Once the solution is available, the user runs the postprocessor EPLOG, interactively on an X-WINDOW, accepting commands that will compute and print a variety of derived quantities like average field, etc.
coefficients, spherical 3D harmonic coefficients, energy, inductances, line or surface integrals of the field, etc. EPILOG can also generate tables of field, permeability, potential, etc. and a variety of plots.

EPILOG is a very useful design tool for the physicist or engineer.

Accuracy is a primary consideration in the MAGNUS package. It is now known that a very important source of large errors is the inappropriate interpolation of magnetization tables. In MAGNUS interpolation is done using the KFP interpolation relation, the most accurate known rule. Another source of inaccuracy is round-off in the calculation of the field of solid conductors. Careful mathematical numerical techniques have been used to rewrite the expressions in such a way that round-off will not affect the results. The accuracy, even in single precision, is better than with the usual expressions in double precision. Numerical quadrature in MAGNUS is done by Carl de Boor’s method, which guarantees the final accuracy, rather than by the usual n-point Gauss formula, which is very inaccurate in many cases but extensively used in other programs.

Publications describing the code:


Is code documentation available?  x  Yes  _  No

How may the code be obtained?

By license agreement with Ferrant High Technology Products, P.O. Box 1866, Orange Park, FL 32067

By agreement with the Texas Accelerator Center, the code is also available free of charge to some HEP groups at National Laboratories through the MIE network

Source Language: FORTRAN IV

Computers it runs on: VAX and CRAY

It is available as: 

- Source code
- Executable only

source Media: Loading, tape, diskette, cards, networks

Tape format: 

diskette 9 1/2" format

Available through: 

- DINEF
- ARPAFIE
- MEXF

Network Address: 

Program Name: MAPPO]

Person to Contact: Eugene Forest
Address: MS 90 1040, EPA Design Center
        - UCRL
        Berkeley, CA 94720
        USA

Telephone Number: (415) 486 6580, FTS 451 6580

Classification of Computer Code:
Component Design:
- RF source
- RF Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

MAPPO generates a Lie-algebraic map that produces tracking results equivalent to those produced the third order matrix code RACETRACK. The output can be put into MARYLIE for the calculation of auxiliary quantities such as chromaticity and nonlinear invariants.

Publications describing the code:

Some yet

Is code documentation available?  Yes No

How may the code be obtained?

Source language: FORTRAN 77
Computers it runs on: CRAY XMP

It is available as: Source code
Executable only

Source Media: Diskette, Tape, Card, Networks

Format: Tape, Diskette, Card, Network

Available through: DECFEL, ARPANET, BINET

Network Address:
Date of Latest Version: unknown

Program Name: MARTUR

Person to Contact: E.S. Baksheev
Address: Institute of High Energy Physics
Serpukhov
USSR

Telephone Number:

Classification of Computer Code:
Component Design:
- Non Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Scattering, Impedances
Other: Radiation loading calculations

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
A set of MARTUR computer codes is created to calculate spatial distributions of high energy proton losses in accelerator structures and arising energy release, induced radioactivity, radiation loadings on equipment and shields. The set of computer codes consists of three major codes: ESSEPT — the code for simulation of initial interaction of circulating proton beam with the energy Eo with an arbitrary "target"; TURTLE — the code for calculation of particle transport; MARSHT — the code for nuclear electromagnetic cascade calculation, which appear in magnetic structure and due to the loss of transported fast protons.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?

Source Language:
Computers it runs on:

It is available as: Source code, Executable only

Source Media:
- Listing, Tape, Diskette, Cards, Networks
- Tape format
- Diskette format

Available through: DECNET, ARPANET, BITNET

Network Ad hoc
Person to Contact: Alex F. Dragt
Address: Physics Department
University of Maryland
College Park, MD 20742
USA

Telephone Number: 301-454-3324

Classification of Computer Code:
Component Design:
Ion Source, Magnet, RF cavity
Accelerator Optimization:
Linac, Cyclotron, Synchrotron, Beam Lines and Storage Rings

Tracking or Simulation:
Linac, Cyclotron, Synchrotron, Beam Lines and Storage Rings

Analysis:
Stability, Impedances

Other: Nonlinear Orbit Behavior, aberrations

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The program employs algorithms based on a Lie-algebra formulation of charged particle trajectory calculations, and is able to compute transfer maps for and trace rays through single or multiple beam line elements. This is done for the full 9-dimensional phase space. All nonlinearities, including chromatic effects, through third (octupole) order are included. In addition, MARYLIE is exactly symplectic canonical through all orders.

MARYLIE may be used both for particle tracking around or through a lattice and for analysis of linear and nonlinear lattice properties. Tracing can be performed element to element, lump to lump, or any mixture of the two. A lump is a collection of elements combined together and treated by a single transfer map. The speed of element to element tracking is comparable to that of other codes. When assemblies of elements can be lumped together to form single transfer maps, tracking speeds can be orders of magnitude faster.

MARYLIE also has powerful analytic tools. They include the calculation of first, second, and third order integrals, the first and second order chromaticities, the other linear lattice functions, and the energy dependence through second order. The dependence of tune on location amplitude, nonlinear lattice functions, nonlinear phase space distortion, transfer maps normal forms, nonlinear resonance driving terms, and nonlinear invariants are all calculated. MARYLIE can be used to give an explicit representation for the linear and nonlinear properties of the total transfer map of a system. These features can be used to evaluate or improve the optical quality of a single pass system and to optimize potential or linear collider. MARYLIE can run in double precision on a VAX-11 and requires 1024 bytes of memory and can evaluate (track) approximately 2 maps per second.

A vectorized version running on a CRAY-X MP in single precision and using only one processor requires 1.8 words of memory and can evaluate approximately 1000 maps per second.
Publications describing the code:

- Alex F. Dragt, Robert D. Byne, Liam M. Healy, Enrico Serni, David R. Douglas, Etienne Forest, "MARYLEF: A Program for Charged Particle Beam Transport Based on the Algebraic Methods.

Is code documentation available? \[ \checkmark \] Yes \[ \Box \] No

How may the code be obtained?

- From Maryland when released

Source language: FORTRAN 77

Computers it runs on: CRAY IBM, VAX UNIVAC, CDC

It is available as: \[ \checkmark \] Source code, \[ \Box \] Executable only

Source Media: \[ \checkmark \] Listing, \[ \checkmark \] Tape, \[ \checkmark \] Diskette, \[ \checkmark \] Cards, \[ \checkmark \] Networks

Tape format:

- Diskette size & format:

Available through: \[ \checkmark \] DECNET, \[ \checkmark \] ARPANET, \[ \checkmark \] BITNET

Network Address: dragt@univm.com
The MASE code is a 2-D, 2-dimensional particle-in-cell code which has been applied to the simulation of a number of microwave devices. It has been used to simulate klystrons and other electron accelerator components.

Publications describing the code:


Hanefeld, H., "Computational Needs for Modelling Accelerator Components," SLAC internal report, SLAC-PUB-798

Is code documentation available?  Yes  No

How may the code be obtained?

From Adam Drobot. The code may also be available from SLAC for instance from H. Herrmannsfeldt.

Source language:

Computer it runs on

It is available as:  Source code, Executable only

Source Media:  Listing, Tape, Diskette, Cards, Networks

List format:  Diskette, etc.

Available through:  DEFNET, ARPANET, BBNET

Contact Address:
MATRACE can be used as a postprocessor to the code RACETRACK. It will generate up to third-order matrices for variables \( x, x', y, y' \) that give equivalent tracking results for the full ring relative to a given trajectory. This is useful for studying misalignments. The output of MATRACE can be put into MARYLIE, which can generate such quantities as chromaticity and non-linear invariants.

Publications describing the code:


Is code documentation available? Yes \( \checkmark \) No

How may the code be obtained?

Call Etienne Forest:

Source language: FORTRAN

Computers it runs on: VAX, CRAY-XMP

It is available as: Source code, \( \checkmark \) Executable only

Source Media: \( \checkmark \) Tape, Diskette, \( \checkmark \) Cards, \( \checkmark \) Networks

Tape format: As received

Diskette size & format:

Available through: \( \checkmark \) DECNET, ARPANET, BITNET

Network Address:
MEDIT - Maximum Entropy Beam Tomography. Intense particle beams require nonintrusive diagnostics. One of these is the light emitted from interaction of the beam with residual gas. If the light is produced by a first-order process linear in the beam density, a profile measured across the beam may be interpreted as a tomographic projection of that density distribution. With a small number of such projections, and appropriate transfer matrices connecting them, Minterbo's maximum entropy (MEDIT) algorithm may be used to construct an estimate of the beam density distribution in both coordinate and phase space. This MEDIT algorithm is running as part of an integrated software system on an LSI 11/23 mounted in the same diagnostic mode where the data is recorded. The solution usually converges in about 5 iterations, each of which takes a few seconds in the typical case of 3 or 4 views of 25 samples each. The subroutine implementing the MEDIT algorithm is being rewritten to make it portable.

Publications describing the code:


Is code documentation available? Yes. C No.

How may the code be obtained?

Contact C. T. Minterbo.

Source language: FORTRAN.

Computer it runs on: PDP11/50.
It is available as: × Source code, Execute only

Source Media: 
- Tape, 
- Diskette, 
- Cards, 
- Networks

Tape if on

Diskette size & format:

Available through: 
- DECNET, 
- ARPANET, 
- BITNET

Network Address: stimulantarp
MICADO is a solver of rectangular systems of linear equations. It is recommended for over-determined systems (more equations than unknowns). The solution is iterative and gives at each iteration the most efficient solutions to reduce the norm of the residual vector. It has been extensively tested for orbit correction. A recent application has been made to dynamic aperture correction.

Publications describing the code:
- B. Audin and Y. Marti, "Closed orbit correction of A G machines using a small number of magnets." CERN ISR MA 73-17

Is code documentation available? Yes

How may the code be obtained?
- Contact ETP Division

Source language: FORTRAN 77

Computer it runs on: IBM

Dataset available as:
- Source code
- Executable only

Source Media:
- Listing
- Tape
- Diskette
- Cards
- Networks

Tape format: unlabelled, parallel, 1200 char block, 8 track record

Diskette format: A format

Available through:
- DECNET
- ARPANET
- BITNET

Network Address: 166.188.6.164
Classification of Computer Code:
Component Design
- Ion Sources
- Magnet
- RF cavity
Accelerator Optimization:
- Linear
- Cyclotron
- Synchrotron
- Beam lines
Tracking or Simulation:
- Linear
- Cyclotron
- Synchrotron
- Beam lines
Analyses:
- Stability
- Impedances

Other:

Short Description: Purpose, capabilities, algorithms, special features, etc.

Purpose: Design of synchrotrons and beam lines; optimization of focusing elements at first order

Algorithms: Linear matrix formalism for transformation of ellipses and single particles; tracking of single particles through linear matrices and thin nonlinear lenses representing multipoles

Special Features
- Interactive operation employing a command structure
- Graphic output of envelopes, ellipses, and particle distributions
- On-line help available
- Interactive graphics using the cursor
- Detailed investigation of nonlinearities in synchrotrons

Publications describing the code:

Code documentation available: Yes, No

How may the code be obtained?

Contact:

Source Language: FORTRAN
Computers: VAX, IBM

License: available as Source code, executable only

Source Media: Listing, Tape, Diskette, Cards, Networks
  Tape format as needed
  Diskette size & format:

Available through DECNET, ARPANET, BITNET
  EARN

Network Address: PT01 at DDAGS13
Short Description of Purpose, capabilities, algorithms, special features, etc.

MISAR is a PARMILA-like multiparticle simulation code that follows the transverse coordinates of a collection of macro-particles from the inflector around the lattice of a circular machine, incorporating the space charge forces of the beam as modified by the image effects in the walls for a number of turns. No longitudinal structure in the beam is included. After each turn around the machine, the number of particles in the "beam" is increased by the addition of a new quantity of beam from the inflector. Provisions are made for time dependent pulsed bumps that can move the equilibrium orbit or the vacuum at the inflector to establish the multturn injection process. As in PARMILA, there are a variety of options for generating the initial coordinates of the inflected beam and a variety of options for displaying the properties of the accumulated beam. The space charge effects are supplied by a set of FORTRAN subroutines which is called one or more times during each beam period of the lattice.

Publications describing the code:


Is code documentation available? Yes No

How may the code be obtained?

M. McVeigh, Accelerator Code Group, Mail Stop G-14, Los Alamos National Laboratory, Los Alamos, NM 87545.

Computer runs on: FORTRAN

Input file format: Executable only

Source code format: Executable only

Laporte, McVeigh, and others

Available through: DEC 11, ARPANET, IBM 370

Network Address: Los Alamos
MOTFER is a ray tracing program intended for analysis and optimization of a system of magnetic elements. Several features are included in MOTFER which are not available in other codes. Among these are Monte Carlo simulation of the beam phase space, a sophisticated definition of the performance including the possibility of computer correction of aberrations based on measurements of the trajectory of each event, the automatic optimization of any parameter of the magnet system, the possibility of the use of field maps for dipoles, quadrupoles, and multipole and the availability of several new elements including an FEL separator, an RF accelerating gap, a wedge degarder and various slots and septumers. To the greatest possible extent, MOTFER makes use of the definition of parameters needed in program RAYTRACE from which it evolved. In order to minimize the pitfalls of problem setup it is suggested that the MOTFER user first study his problem with the standard codes TRANP, DORT, DORT, and RAYTRACE in that order.

Publication describing the code:

H. A. Hoesen, C. M. Klem,  Design of Mass spectrometer at HASYLAB, CERN, report PS-IV-16-6, 1976 on Magneto Technology, Brookhaven National Laboratory, 156214.

Is code documentation available?  Yes  No

How may the code be obtained:

Contact: Los Alamos Accelerator Code Group CAC 4657-657, 5657-2400, 1111 8th Ave.

Compiler required: FORTRAN

Operating systems: VAX, VAX

Available as:  Source code, Executable only

Operating systems: LINUX, APPLE, DECIT, Tandy, Network.

Available through:  ARCHIVE, ARPA, IBM, BLUES

Note: Additional weighting.
Classification of computer code
Ion Source, Magnet, Other

Accelerator, Optics

Simulator, Beamlines

Analysis, Impurities

Other

Short Description

Macro-particle tracking code; non-relativistic, integrates equations of motion through user-defined external electric and magnetic field, built-in components, quadrupoles, solenoids, dipole beam focusing, dipole magnets, 3D field. Full 3D space charge. No charge focusing.

Initial distributions available: 1D waterbag, 1D kA, user-defined. Highly specialized and time-consuming code for design and analysis of low-energy beam lines.

Publications describing the code


Code documentation available: Yes, No

How may the code be obtained

Contact person: Bruce M. Martin

SOURCE CODE:

Yes, accessible through GRAY 3M 8.

LDF:

Yes, accessible on tape. 10.5 MB.

FORTRAN

Yes, accessible on tape.

Software:

Yes, accessible on tape. Requires FORTRAN, GRAY 3M B.

Operating Systems:

VICE-OP, DOD MAC, ARPANET, MIP 11.
Date of Latest Version: unknown

Person to Contact: V. F. Baranov or A. V. Cases
Address: Institute for High Energy Physics

Moscow region
USSR

Telephone Number

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The MULTIMODE code is used for computing the lowest eigenfrequencies and electromagnetic fields in homogeneous waveguides and axially symmetric cavities. Eight code nonparametric finite elements are used, which give the exact approximation of curvilinear region boundaries and high accuracy in computations of frequencies on a small number of grid nodes. The comparison of MULTIMODE with other programs shows that MULTIMODE attains the same accuracy while running 10-100 times faster. The program allows the computation of both simple and degenerate frequencies.

Publications describing the code:


Code documentation available? Yes No

How may the code be obtained?

Source Language

Computer Language: C

Source code: Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Language: Executable only

Diskette: Yes, No

Available on: DECNET, ARPANET, BITNET

Network Address:
I)alf-

Classification of Computer Code:

Component Design:
- Ion Source, RF cavity, Accelerator Optimization,
- Linac, Cyclotron, Synchrotron,
- Tracking or Simulation:
  - Linac, Cyclotron, Synchrotron,

Analysis:
- Stability, Impedances,

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This is a general multiparticle code developed for studying particle motion in cyclotrons. It is related to the structure of the GANIL separated-sector cyclotrons; it could be adapted to other configurations.

Its main limitation comes from the shape of the accelerating gaps which are presently restricted to radial ones. Accelerating field effects are expressed as kicks applied at the gap centers allowing for a complete decoupling in the magnetic and electric fields.

Simplified versions have been derived, restricted either to the median plane (JOAN) or to a single particle in this plane (ANJO). In its most general version, the code takes into account space charge effects. A more precise description of these codes including listings and examples is given in the internal report listed below.

Publications describing the code:


Is code documentation available?  yes  no

How may the code be obtained?


Source language: FORTRAN

Computers it runs on: UNIVAC 1108, IBM 360 in the near future.

It is available as:  source code, executable only.

Source Media:  listing, tape, diskette, cards, networks.

Lape format: card 00001

Diskette: fuse format, IBM 32 160

Available through:  DECNET, ARPANET, UUNET

network available
Date of Latest Version: 1981

Person to Contact: Joe Tesmer
Address: MS K784, Group P-10
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505-667-6370, FTS 843-6370

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron, Electrostatic Accelerator
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron, Electrostatic Accelerator
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Early program used for beam optics in electrostatic accelerators. Good treatment of accelerating tubes and strippers. Time dispersion treatment of bunched beams.

Custodian: J. D. Larson, 10011 E 35th Terr., Independence, MO 64052

Based on code by T . J. Devlin (UCRL-9727)

Publications describing the code:
T. J. Devlin, Univ. of California Internal Report UCRL 9727

Is code documentation available? Yes No

How may the code be obtained?
Contact Joe Tesmer

Source Language: FORTRAN

Computers it runs on: VAX

It is available as: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks
Tape format:ASCII
Diskette size: ASCII

Available through: DECNET, ARPANET, BITNET

Network Address

(Additional details may be included here for network addresses and other contact information.)
Date of Latest Version: unknown

Program Name: OSCAV2

Person to Contact: Paolo Fernandez

Address: Instituto per la Matematica Applicata
         Consiglio Nazionale delle Ricerche
         Via L. B. Alberti, 4
         16132 Genova, ITALY

Telephone Number: unknown

Classification of Computer Code:

Component Design:
- Ion Source, Magnet, RF cavity

Accelerator Optimization:
- Linac, Cyclotron, Synchrotron

Tracking or Simulation:
- Linac, Cyclotron, Synchrotron

Analysis:
- Stability, Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

This is a 2-D rf cavity code. (No more information available at this time)

Publications describing the code:

unknown

Is code documentation available? Yes No

How may the code be obtained?

Source language:

Computers it runs on:

It is available as: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks
Tape format:
Diskette size & format:
Available through: DECNET, ARPANET, BITNET

Network Address:
Classification of Computer Code:
Component Design:
- Ion Source, ☑ Magnet, ☐ RF-cavity, ☐
Accelerator Optimization:
- Linac, ☑ Cyclotron, ☑ Synchrotron, ☐
Tracking or Simulation:
- Linac, ☑ Cyclotron, ☑ Synchrotron, ☑
Analysis:
- Stability, ☑ Impedances, ☐
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Calculates static magnetic field in two cartesian dimensions or cylindrically symmetric configurations in
3D. Handles permanent magnet materials as well as permeable iron and current carrying coils. Can solve
ferroelectric problems also. Uses the "direct" method to solve the 2D, generalized POISSON equation.
Included in the group of codes is AUTOMESH, LATTICE, and FORCE.

Publications describing the code:
K. Halbach, "Design of Permanent Multipole Magnets with Oriented Rare Earth Cobalt Materials,"
Nucl. Inst. and Meth., 169 (1980) 1-19

Is code documentation available? ☑ Yes ☐ No

How may the code be obtained?
Send blank tape to above address; specifying version desired (VAX or CRAY). Also available through
ARPANET, DECNET or BITNET; telephone for instructions.

Source language: FORTRAN 77

Computers it runs on:
It is available as: ☑ Source code, ☐ Executable only

Source Media: ☒ Listing, ☐ Tape, ☐ Diskette, ☐ Cards, ☐ Networks
Tape format: ☐ 9 track, 1600 bpi, 80-char line
Diskette size & format:
Available through: ☑ DECNET, ☐ ARPANET, ☐ BITNET

Network Address: like standard
Date of Latest Version: unknown

Program Name: PAQUASEX

Person to Contact: S. Kofers

Address: Stanford Linear Accelerator Center
Stanford University
Stanford, CA 94305
USA

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source, □ Magnet, □ RF cavity, □ Accelerator Optimization:
- Linac, □ Cyclotron, □ Synchrotron, □ Tracking or Simulation:
- Linac, □ Cyclotron, □ Synchrotron, □
Analysis:
- Stability, □ Impedances, □ Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
PAQUASEX is essentially a combination of the three codes PATRICIA, QUADS, and MICROSEX. The system is designed to do a configuration survey over a grid of points in the space of main configuration parameters $\varphi_0, \varphi_0', \varphi_0''$ and $\eta_0$ (the star means the value of a parameter at the interaction point).

The system starts by preparing with the help of PATMOD input data decks for QUADS and MICROSEX, i.e., target values of desired parameters. One option prepares a deck for a grid of 5x5 points in $\varphi_0, \varphi_0'$ space. The other option prepares five sets of five points. Each set of five points are increments in one of the five above-mentioned parameters (keeping all others fixed). These options are selected by means of the control code number KW1106.

Publications describing the code:

Is code documentation available?  □ Yes  □ No

How may the code be obtained?
unknown

Source Language

Computers it runs on:

Available as:  □ Source code, □ Executable only

Source Media:  □ Listing, □ Tape, □ Diskette, □ Cards, □ Networks

Tape Format:  □

Diskette are: □

Available through:  □ INTEL, □ ARPAFILE, □ BNLFILE

Network Address:  □
Date of Latest Version: July 1986

Person to Contact: Gerry Morgan
Address: Brookhaven National Lab
        Upton, Long Island, NY 11973
        USA

Telephone Number: 516-282-1841 FTS 5656 1841

Classification of Computer Code:
Component Design:
Non Source, Magnet, RF cavity.

Accelerator Optimization:
Linac, Cyclotron, Synchrotron.

Tracking or Simulation:
Linac, Cyclotron, Synchrotron.

Analysis:
Stability, Impedances.
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PAR2DOPT is used in the optimization of coil placement of circular cross section
magnets of the type used in the design of SSC magnets. It optimizes the
azimuthal position and tilt of layered turns and the number of turns per block.
The layers of turns need not be fully keystoned, but can be shimmued
with wedge-shaped material. The code can be run with or without
infinite permeability iron surrounding the coils. The optimizer is based on the
cERN code MINUIT. It has some Tektronics 4010 based graphics
output. The code is still in the development stage and has no documentation.

Publications describing the code:
None. The authors of the present code include Richard Fornow, Gerry Morgan and
Patrick Thompson.
Shimon Caspi at LBL has a copy.

Is code documentation available? Yes X No

How may the code be obtained?
Call Gerry Morgan

Source language: FORTRAN

Computers it runs on: VAX, CDC 7600

It is available as: Source code, Executable only


Laptop format: whatever

Diskette type, format

Available through: DESY, CERN, ARPANET, BBN, UCLA

Network Address: None

Program Name: PAR2DOPT
Classification of Computer Code:

Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PARMELA means Phase And Radial Motion in Electron Linear Accelerators. It is a variation of PARMILA that applies to standing wave electron linacs and transport lines. The user must supply the linac structure and the fields in the basic rf cell. Multiparticle tracking is done with space charge forces. The independent variable is time, as opposed to distance along the beam line, which is used in the nonversion PARMILA. The code was written by Ken Grindall. The code will generate several types of input electron distributions. The output is a file of particle distribution in 6D phase space at the exit of each rf cell. There is a postprocessor called PARGRAPH which will make phase space scatter plots. The code is partially documented.

Publications describing the code:
None

Is code documentation available? Yes x No

How may the code be obtained?
Contact Lloyd Young

Source language: FORTRAN

Computer it runs on: CDC 7600 CRAY

It is available as: x Source code, x Executable only

Source Media:
- Listing
- Tape
- Diskette
- Cards
- Networks

Tape format as listed
Diskette type, format:
Available through:
- DECNET
- ARPANET
- BITNET

Network Address: 

IP address: 

Domain: 

Site: 

Contact: Lloyd Young

Fax: 

Phone: 

Address:

Los Alamos National Laboratory
Los Alamos NM 87545
USA

Classification of Computer Code:

Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PARMELA means Phase And Radial Motion in Electron Linear Accelerators. It is a variation of PARMILA that applies to standing wave electron linacs and transport lines. The user must supply the linac structure and the fields in the basic rf cell. Multiparticle tracking is done with space charge forces. The independent variable is time, as opposed to distance along the beam line, which is used in the nonversion PARMILA. The code was written by Ken Grindall. The code will generate several types of input electron distributions. The output is a file of particle distribution in 6D phase space at the exit of each rf cell. There is a postprocessor called PARGRAPH which will make phase space scatter plots. The code is partially documented.

Publications describing the code:
None

Is code documentation available? Yes x No

How may the code be obtained?
Contact Lloyd Young

Source language: FORTRAN

Computer it runs on: CDC 7600 CRAY

It is available as: x Source code, x Executable only

Source Media:
- Listing
- Tape
- Diskette
- Cards
- Networks

Tape format as listed
Diskette type, format:
Available through:
- DECNET
- ARPANET
- BITNET

Network Address: 

IP address: 

Domain: 

Site: 

Contact: Lloyd Young

Fax: 

Phone: 

Address:

Los Alamos National Laboratory
Los Alamos NM 87545
USA

Classification of Computer Code:

Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PARMELA means Phase And Radial Motion in Electron Linear Accelerators. It is a variation of PARMILA that applies to standing wave electron linacs and transport lines. The user must supply the linac structure and the fields in the basic rf cell. Multiparticle tracking is done with space charge forces. The independent variable is time, as opposed to distance along the beam line, which is used in the nonversion PARMILA. The code was written by Ken Grindall. The code will generate several types of input electron distributions. The output is a file of particle distribution in 6D phase space at the exit of each rf cell. There is a postprocessor called PARGRAPH which will make phase space scatter plots. The code is partially documented.

Publications describing the code:
None

Is code documentation available? Yes x No

How may the code be obtained?
Contact Lloyd Young

Source language: FORTRAN

Computer it runs on: CDC 7600 CRAY

It is available as: x Source code, x Executable only

Source Media:
- Listing
- Tape
- Diskette
- Cards
- Networks

Tape format as listed
Diskette type, format:
Available through:
- DECNET
- ARPANET
- BITNET

Network Address: 

IP address: 

Domain: 

Site: 

Contact: Lloyd Young

Fax: 

Phone: 

Address: 

Los Alamos National Laboratory
Los Alamos NM 87545
USA
Date of Latest Version: Jan 1986

Person to Contact: Los Alamos Accelerator Code Group

Address: MS B420, Group AE-6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 6677 or 2399, FTS 643 6677

Classification of Computer Code:

Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PARMILA means Phase And Radial Motion in Ion Linear Accelerators. Given the electric and magnetic fields in one of cavity and the gap-length-to-cell-length function for the cavity design from code like SUPERFISH, PARMILA will generate the layout for a multielement DTL. It also does multiparticle tracking with space charge through the linac or through a transport line. There are several choices of input particle distributions: K. G. G. distribution, uniform, rectangular and experimental data. The default space charge subroutine assumes a circular beam and makes the impulse approximation once per cell. Other subroutines can be substituted if desired. The output is a file with the phase space distribution at the exit of each cell. There is a postprocessor called OUTPROG that will plot beam profiles as a function the beam direction and particle distribution for cross sections of phase space, e.g., x, y, y, etc. OUTPROG also calculates moments of the distribution. The code is partially documented.

Publications describing the code:

None

Is code documentation available? 
• Yes 
• No

How may the code be obtained?

Contact the Los Alamos Accelerator Code Group

Source Language: FORTRAN

Computer it runs on: CDC 6600, CRAY 1

If available as:
• Source code
• Executable only

Source Media:
• Tapes
• Diskettes
• Cards

Filing format:
• Tape format
• Diskette format

Available through:
• DEFEX
• ARPANET
• BITNET

Network Address: Losalamos.aopa
Person to Contact: The Los Alamos Accelerator Code Group
Address: MS H1029, Group AP1
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505-665-6677 or 2839, FTS 843 6677

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- LINAC
- Cyclotron
- Synchrotron

Tracking or Simulation:
- LINAC
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PARMITEQ is a version of PARMILA that will generate a design for an RFQ ion accelerator and also do multiparticle tracking with space charge through the linac. To do the design layout the program needs the output of two codes RFQIK and CURLY, described elsewhere. There are several types of input distributions available.

In PARMITEQ, Z (distance along the beam) is the independent variable. In PARMITEQ(0) time is the independent variable. The output is a file of particle distributions over 6D phase space at the end of each RFQ cell. There is a post-processor called OUTPROG that will calculate moments, make phase space plots and beam profiles.

Publications describing the code:
- None

Is code documentation available?  
- Yes  
- No

How may the code be obtained?
- Call The Los Alamos Accelerator Code Group

Source Language: FORTRAN

Computers it runs on: CDC 5000 CRAY 1

Files available as:
- Source code
- Executable only

Source Media:  
- Listing
- Tape
- Diskette
- Cards
- Networks

File format:
- text
- almost any format

Diskette are A format

Available through:
- DECMFIT
- ARPANEL
- BIRNED

Contact Address: Identical with above
Person to Contact: Los Alamos Accelerator Code Group
Address: MS 1429, Group A1 6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505-667-6677 for 667-2839, FTS 843-6677

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
- Beam Transport

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
PATH is a group of computer programs for simulating charged particle beam transport systems. It was developed for evaluating the effects of some aberrations without a time-consuming integration of trajectories through the system. The beam transport portion of PATH is derived from the well-known program DECAY TURTLE. PATH contains all features available in DECAY TURTLE (including the input format) plus additional features such as a more flexible random-ray generator, longitudinal phase space, some additional beamline elements, and space charge routines. One of the programs also provides a simulation of an Alvarez linear accelerator. The programs are usually written for a CDC 7600 computer system, but they are also available on a VAX VMS system. All of the programs are interactive with input prompting for ease of use.

Publications describing the code:

Is code documentation available? Yes

How may the code be obtained?
- Contact the Los Alamos Accelerator Code Group

Source Language: FORTRAN

Computer on which runs: VAX, CDC

Distribution:
- Source code
- Executable only

Source Media:
- Tape
- Diskette

Format:
- Tape format
- Diskette format

Available through:
- DECNET
- ARPA NET
- BITNET

Network Address: losalamos.uu.net
Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PATPET is a combination of PATRICIA and PETROS. It is a tracking program that takes into account multipole, systematic field errors, and misalignments. It produces dynamic apertures in one run based on tracking 100 particles.

Publications describing the code:
- User's Guide (draft)

Is code documentation available? Yes No

How may the code be obtained?
Contact Helmut Wiedemann

Source language: FORTRAN

Computers it runs on: VAX

It is available as: Source code, Executable only

Source Media: Tape, Diskette, Cards, Networks
Lrpe format:
Diskette size & format: Floppy

Available through: DECNET, ARPANET, BITNET

Network Address: TRIM
Date of latest version: unknown

Program Name: PACAC

Person to contact: A. Blanc
Address: CERN
1211 Geneva 23
Switzerland

Telephone number:

Classification of computer code:
Component design:
- Ion Source,
- Magnet,
- RF cavity,

Accelerator Optimization:
- Linac,
- Cyclotron,
- Synchrotron,

Tracking or Simulation:
- Linac,
- Cyclotron,
- Synchrotron,

Analysis:
- Stability,
- Impedances,
- Other:

Short description: (Purpose, capabilities, algorithms, special features, etc.)

PACAC tracks a tracking program using a magnet matrix formalism for elements up to quadrupoles and thin lens approximation for multipole up to 12 poles. The magnet matrices are similar to those used in the code AGS but have been extended to allow rotated magnets and hence coupled motions.

Publications describing the code:
- P. Fugiers A. Hlaire and A. Warmaun, "PACAC Particle Tracking Program," Proc. 4th Workshop on Accelerator Orbit and Tracking Programs, Brookhaven, Brookhaven National Laboratory Internal Report BNL 41982.

Is code documentation available? Yes No

How may the code be obtained?
- unknown

Source language:
- Computer it runs on:

Is it available as:
- Source code,
- Executable only

Source Media:
- Listing, Tape, Diskette, Cards, Networks

File format:
- Non-proprietary & format

Available through:
- DECNET, ARPANET, IBMnet

Network access:
Classification of Computer Code:
Component Design:
  - Ion Source
  - Magnet
  - RF cavity
Accelerator Optimization:
  - Linac
  - Cyclotron
  - Synchrotron
Tracking or Simulation:
  - Linac
  - Cyclotron
  - Synchrotron
Analysis:
  - Stability
  - Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The program does the following calculations:
1. It adjusts horizontal and vertical chromaticities to the values prescribed by the user.
2. It calculates Twiss parameters and eta functions of the lattice.
3. It calculates emittances of the beam and relevant parameters of the ring.
4. It performs harmonic analysis of the particle motion and produces its frequency spectrum.
5. It tracks up to four particles simultaneously through up to one thousand revolutions. The oscillations in all three degrees of motion can be included into calculations, but horizontal and vertical motions are treated independently one耦ing is taken into account besides that which appears from the passage of a displaced particle through a sextupole. In all these calculations usual (3x3) matrix formalism is used. Sextupoles are treated in thin lens approximation. PATRICIA does not fit parameters of a linear lattice. The program uses the lattice which is supplied to it and attempts to find a periodic solution for the Twiss parameters and the dispersion function. If no periodic solution can be found for the on-momentum particle the program stops. To investigate the influence of higher multipole fields in different elements of a machine an optional version of PATRICIA under the name PNWM can be used. The action of the nonlinear field in a given element is approximated by an effective integrated nonlinear "kick". The longitudinal position of the kick is at the discretion of the user.

Publication describing the code:
Threats, Tracking Studies in BEP and Description of the Computer Code PATRICIA - A V
version at RAL 14.63.4 (1982.89)

If code documentation available? Yes No

How can the code be obtained?

Source: ANL

Program Name: PATRICIA
Date of Latest Version: Unknown

Person to Contact: John M. Jowett
Address: LEP Division
CERN
CH 1211 Geneva 23
Switzerland

Telephone Numbers: +41 22 76 60 43 or +41 22 76 50 86

Classification of Computer Code:

Component Design:
- Ion Source.
- Magnet.
- RF cavity.
- Accelerator Optimization:
  - Linac.
  - Cyclotron.
  - Synchrotron.

Tracking or Simulation:
- Linac.
- Cyclotron.
- Synchrotron.

Analysis:
- Stability.
- Impedances.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PATTY is a version of H. Wiedemann's PATRICIA program which has been used at CERN since 1982. The main modification of the program was to provide high-quality graphics via the CERN GSP package. It is possible to watch animated "movies" of the particle motion on a terminal screen. Some additional analysis of particle power spectra is included.

Publications describing the code:


Is code documentation available? x Yes x No

How may the code be obtained?
Contact M. Jowett

Source Language: FORTRAN 77

Computer it runs on: IBM

Data available as:
- Source code.
- Executable only.

Source Media:
- Taping.
- Tape.
- Diskette.
- Card.
- Network.

Tape format:
- Diskette format:

Available through:
- DECNET
- ARPANET
- INTERNET

Scored cited: CERN bibliography
PF2D is a 2D code for the analysis of magnetostatic or electrostatic fields and steady state and transient eddy currents. It can be used for a wide range of applications including fusion and accelerator magnets, electron beam lenses, non-destructive testing, actuators, and MRI magnet shielding.

PF2D enables the solution of the partial differential equation governing a system to be computed using the finite element method. The packaged pre-processor provides powerful tools to aid data input.

The design requiring analysis is defined as an assembly of simple primitives, for example curved quadrilaterals, which are then automatically subdivided by the program. The simple primitives have symmetry properties and may be replicated by rotation, reflection and translation. Using these features together with the copy and modify facilities, it is easy to model even the most complex geometry.

The geometric primitives have assigned material properties. These may be material constants such as permeability, conductivity and current density. Material properties can be specified as tables of function values.

PF2D uses either first or second order triangular finite elements. The first order solution can be used to obtain a fast test of the model before solving to higher accuracy using second order elements.

There are three analysis programs provided with PF2D:

- static fields (non-linear and laminated materials)
- transient fields (non-linear)
- steady state alternating current fields (linear)

The pre-processor provides extensive facilities for presentation and display of the results. These include potential fields and lines.

State of the art output analysis and display provide the user with information necessary for improving the input data to achieve the necessary accuracy in an economical way.
Publications describing the code:


Data Sheet Ref. 118522 from Vector Fields

Is code documentation available? ☑ Yes ☐ No

How may the code be obtained?

By license agreement with Vector Fields, Ltd

Source language: FORTRAN 77

Computers it runs on: PRIME, VAX, IBM

It is available as: ☑ Source code, ☐ Executable only

Source Media: ☑ Listing, ☑ Tape, ☐ Diskette, ☐ Cards, ☐ Networks

Tape format: As required

Diskette size & format:

Available through: ☑ DECNET, ☐ ARPANET, ☐ BITNET
☑ DOE Network

Network Address: Contact Bob Lari - Argonne National Laboratory (312) 972-6832
Classification of Computer Code:
Component Design:
- Non Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances
- Closed Orbit Distortion

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
It computes betatron and dispersion functions, synchrotron frequency. It calculates the radiation integrals, damping partition numbers, beam emittances, bunch length and energy spread. The effect of given or random distortions (misalignments) on the closed orbit and betatron motion is determined (with or without radiation losses). Different algorithms for correcting the orbit are included (amplitude minimization, successive bumps, iterative method using a small number of correctors).

Publications describing the code:

Is code documentation available?  Yes

How may the code be obtained?
Contact G. Gounard or Y. Marty

Source language: FORTRAN 77

Computers it runs on: IBM

It is available as: Source code

Source Media: List, Tape, Diskette, Cards, Networks
- Tape format: Unibit tape, 1600 Bps, 2000 byte block, 80 char record
- Diskette format

Available through: DECFIL, ARPNET, BITNET

Network Address: UNICENT
Date of Latest Version: unknown

Person to Contact: K. Steffen
Address: DESY
Nordstrasse 85
2000 Hamburg 82
Fed Rep. Germany

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
- Orbit Correction

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
A computer program which simulates effects of possible error sources on the beam optics and the improvements due to orbit correction is a necessary tool for the study and design of large electron rings. Such a program called "PETROS" exists at the DESY laboratory. PETROS can work in two modes: 1. Uncoupled transverse motions are assumed and the usual three-dimensional matrices are used in each plane. 2. Coupled transverse motions are considered and five-dimensional matrices are used throughout. It treats non-linear fields and effects of the radiation losses due to bending. It computes the linear transformation matrices of a ring structure, the corresponding betatron and dispersion functions, betatron, and synchrotron frequencies. It calculates the five synchrotron radiation integrals, the damping partition numbers, the damping times, the length deviation of off-momentum orbits, beam emittances, bunch length, relative energy spread and synchrotron lifetime, the effect of prescribed or random distortions, taking into account the radiation losses due to bending. It simulates closed orbit corrections and gives the corresponding kick amplitudes.

Publications describing the code:

Is code documentation available? Yes

How may the code be obtained?
Unknown. Seems to be available from DESY as PETROS and from CERN as PETROS.
Date of Latest Version: unknown
Program Name: PINWHEEL

Person to Contact: F R Close
Address: 1 Cyclotron Road
Lawrence Berkeley Laboratory
Berkeley, CA 94720
USA

Telephone Number: (415) 486 6168, FTS 451 6168

Classification of Computer Code:
Component Design:
- Ion Source, ☑ Magnet, ☑ RF cavity, ☑
Accelerator Optimization:
- ☑ Linac, ☑ Cyclotron, ☑ Synchrotron, ☑
Tracking or Simulation:
- ☑ Linac, ☑ Cyclotron, ☑ Synchrotron, ☑ Spectrometer

Analysis:
- ☑ Stability, ☑ Impedances, ☑
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

PINWHEEL was used for tracking orbits of charged particles in a combined electric and magnetic field. Runge-Kutta integration is used to solve the first-order Hamilton's equations of motion. The program has 3 parts: control, plotting, and integration.

Publications describing the code:

Is code documentation available? ☑ Yes ☑ No

How may the code be obtained?
unknown, probably unavailable

Source Language: FORTRAN IV

Computer it runs on: CDC 6600, 7600

It is available as  ☑ Source code, ☑ Executable only
Source Media: Listing, Tape, Diskette, Card, Networks

Lape format: ☑
Diskette size: ☑

Available through: ☑ DECNL, ☑ ARPANET, ☑ IBMNET, ☑

Network Address:
Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
A new code, PISCES, has been developed for calculating a complete set of rf electromagnetic modes in an axysymmetric cavity. The finite-element method is used with up to third-order shape functions. Although two components are enough to express these modes, three components are used as unknown variables to take advantage of the symmetry of the element matrix. The unknowns are taken to be either the electric field components $E = (E_x, E_y, E_z)$ or the magnetic field components $H = (H_x, H_y, H_z)$. The zero divergence condition is satisfied by the shape function within each element.

Publications describing the code:
A. Iwasita, "Calculation of RF Fields in Axysymmetric Cavities," Los Alamos National Laboratory report LAUR 85-8392

Is code documentation available?  Yes ☑ No

How may the code be obtained?
- Contact author

Source language: FORTRAN

Computers it runs on: VAX 860

Available as: ☑ Source code, ☑ Executable only

Source Media: Listing, ☑ Tape, Diskette, Cards, Networks
- Tape format
- Diskette: ☑ A format
- Available through: DEPEND, MRPANEL,氰anel

Network Address:
Person to Contact: Program Library
Address: CH-1211 Geneva
Switzerland

Telephone Number: (22) 33 2377

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
- Magnet design in 2 dimensions
- Finite element method, triangular mesh
- Also for various scalar potential distributions

Publications describing the code:
- CERN Program Library Writeup 1602

Is code documentation available? (Yes) Yes (No)

How may the code be obtained?
- CERN Program Library

Source Language: FORTRAN 77

Computer it runs on: IBM ED

It is available as:
- Source code, Executable only
- Source Code, Manual, Tape, Diskette, Cards, Networks

- Source Code, Manual on
- Tape format, volume
- Diskette size & format

Available through: EDENET, ARPANET, BBNET

Network Address:
Program Name: FORTRAN 77

Computer Systems: VAX, CRAY

Available as: Source code, Executable only

Source Media: Tape, Diskette, Cards, Network

Available Through: DTIC ADA, ARPA, RADC, BBN

For more information, contact:

Program Name: FORTRAN 77

Computer Systems: VAX, CRAY

Available as: Source code, Executable only

Source Media: Tape, Diskette, Cards, Network

Available Through: DTIC ADA, ARPA, RADC, BBN

For more information, contact:
Date of Latest Version: Oct 86

Person to Contact: R. C. Gupta
Address: Brookhaven National Laboratory
Building 42 B
Upton, NY 11973
USA

Telephone Number: 469-2210, 638-666 1206

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- LMAC
- Cyclotron
- Synchrotron
Tracking or Simulation:
- LMAC
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances

Other

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
POISSON-BNL is the modified version of the 1981 Los Alamos National Laboratory version of the Poisson Group codes created by Holmes and Halka. Major modifications have been made in the AUTOMESH and LATTICE programs. The user now has more control over the type of mesh to be generated and can use different mesh size at any number of places, anywhere in a model. These improvements allow one to describe the finer details of a complicated geometry with a reasonable number of mesh points. In POISSON one now has access to the intermediate results while the original run is progressing, for a better control of convergence. Also there is a lesser chance that a solution will diverge.

Publications describing the code:
2. To be available from the Los Alamos Accelerator Code Group for the standard Poisson Group codes.

Code documentation available? Yes

How can the code be obtained?

Send R. C. Gupta

Computer Language: FORTRAN 77

Computer on which run: VAX

For available as: Source code
Executeable only

Source Media: Tape
Printed Cards

Lecture Notes

Available through:
- PROMETHEUS
  - ARPA Net
  - BBN Net

Network Address: BBN Net: superbucket 392-4 314-75 414-4 314-7

Program Name: Poisson ICN
Date: [Redacted]

Person to contact:

Address:

Lawrence Berkeley Laboratory
Leyton Road
Oakland CA 94610

Telephone No.: 847-6141 FL 1411

Classification of Computer Code
Component Design:
Ion Source
Magnet
RF cavity

Accelerator Optimization:
Linac
Cyclotron
Synchrotron

Tracking Simulation:
Linac
Cyclotron
Synchrotron

Analysis:
Stability
Impedance

Other

Short Description/Purpose, capabilities, algorithms, special features, etc.

This is a generalization of the standard POISSON code which replaces simple constant Neumann-Dirichlet boundary conditions by more general conditions expressible in the form of series of harmonic functions giving the physically correct behavior of the potential at large distances. The code can handle the superposition of an externally applied field as well.

Although the original version was written for the HP1000, there exists a version which runs on the VAX. Documentation exists for the original POISSON code changes are described in the publication below.

Publication describing the code


Is code or output available? Yes

How can the code be obtained?

Source language FORTRAN...

Computer... IBM 370...

It is available as source code. Executable only.

Source Media
- Listing
- Tape
- Diskette
- Cards
- Networks
  - Tape format
  - Diskette tape format

Available through: DITNF1, AIRPANEL, BITEMF1

Network Address...
Date of Latest Version: April 1986

Program Name: POISSON

Person to Contact: A. Schmidt or S. Presser

Address: Texas Accelerator Center
2101, Aberfoyle Place
The Woodlands, TX 77380

Telephone Number: 2103600121

Classification of Computer Code:
Component Design
Ion Source, Magnet, RF cavity.

Accelerator Optimization:
Lam, Cyclotron, Synchrotron.

Tracking or Simulation:
Lam, Cyclotron, Synchrotron.

Analysis:
Stability, Impedances.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc)

This is a modification of the original POISSON code developed by Helmer and Hallbach, where the magnetization table accurately interpolated. Table truncation errors are avoided and data input is simpler. Imagine the field at a point on a magnet as given by the sum of contributions from each little element of magnetized iron plus a contribution from the currents. The field can be accurately calculated only if the magnetization is accurately known at each point. In POISSON, the magnetization is calculated by interpolating a table with the assumption that \( m \) is a linear function of \( B^2 \) in each interval. It is now known that such an assumption produces errors as large as \( 5 \% \) in some intervals. POISSON internal table (for steel), which are larger than the experimental errors in the measurement of \( m \). To solve this difficulty, a table with 100 points has been generated for 100K steel using accurate interpolation techniques. This table has been implemented as the internal table of POISSON. The points are so close that POISSON's assumption of \( m \) is \( B^2 \) does not introduce any appreciable error, and field accuracy can be obtained. POISSON has also added a warning when truncation of the magnetization table occurs as a consequence of high fields during iteration. It has been shown that convergence to an incorrect solution takes place when truncation errors are present. However, it appears only during the initial iterations and then stops convergence es to the correct solution.

POISSON also has an improved data input scheme. POISSON IAC is available for PAX, and the documentation exists for the original POISSON code.

Information describing the code:

Unmetake: The Interpolation of Magnetization Tables COMPIL (2081).

Also works with Presser's Magnetization Tables for lam, cyclotron, and synchrotron.

Documentation is available from the above.

Health Management Information:

This is a modification of the original POISSON code.
Source language: Basic

Computers it runs on: VAX and PDP

It is available as: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Tape format

Diskette size & format

Available through: DECNET, ARPANET, BBNET

Network Address:
Date of Latest Version: Apr 1986

Person to Contact: PROFI Engineering
Address: Wilhelmstrasse 106
Darmstadt
Fed Rep Germany

Telephone Number: 06151-2418

Classification of Computer Code:
Component Design:
- Ion Source, - Magnet, - RF cavity, - Electric machines

Accelerator Optimization:
- Linac, - Cyclotron, - Synchrotron

Tracking or Simulation:
- Linac, - Cyclotron, - Synchrotron

Analysis:
- Stability, - Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The computer program PROFI (program for calculation of fields) which calculates 2 or 4 dimensional non-linear magnetostatic fields, linear electro-static or stationary electric fields, stationary or non-linear 2 dimensional eddy current fields and stationary temperature distributions. The program uses the finite difference method. The calculations may be carried out in one of five different coordinate systems, two of them being 3-dimensional. A set of service programs for preparing the input data, analysing the results, data handling etc. simplifies the use of the program.

Publications describing the code:

W. Muller et al. "Numerical solution of 2 or 4D Nonlinear field problems by means of the Computer Program PROFI" Archiv fur Elektrotechnik 65(1):98-100

Is code documentation available: - Yes - No

How may the code be obtained:

This code can be bought from PROFI Engineering. Purchase also includes updates and some assistance in learning the code

Computer programs on "MINICODE" or on "INTEGRAL"

Frontend: - Source code, - Executable only

source files - Compiler - User D. kette "CODE NETWORK"

Available through: - DECnet - ARPANET - BBNnet

Not yet available.
Date of Latest Version: unknown

Person to Contact: A. G. Dakovsky
Address: Institute for High Energy Physics
             Serpukhov
             USSR

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source, "Magnet, "RF cavity
Accelerator Optimization:
- Linac, "Cyclotron, "Synchrotron
Tracking or Simulation:
- Linac, "Cyclotron, "Synchrotron
Analysis:
- Stability, "Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
A program package for calculating eigenfrequencies and electromagnetic fields with azimuthal variations in axial symmetric cavities of an arbitrary shape. The method is based on the representation of the equations of hydrodynamics in variables \( \phi, \psi \). Apart from frequencies and fields, the accumulated energy, distribution of losses in the metal, and other characteristics important for application are also computed. The package offers wide possibilities for graphic representation of the field topology, facilitating the analysis and optimization of complicated accelerating structures. The program works in two modes: a mode of estimating the frequency spectrum in the specified interval and a mode of accurate computation of a specific frequency, related fields and derived quantities.

Publications describing the code:


Is code documentation available? Yes No

How may the code be obtained?
unknown

source language:
Computers it runs on:
It is available as: Source code, Executable only
source media: {format}
Format: Tape, Diskette, Cards, Networks

Available through: DRUNET, ARPANET, BITNET

Network Access:
Date of Latest Version: unknown

Program Name: PRUD-0

Person to Contact: A.G. Abramov
Address: Institute for High Energy Physics
Serpukhov
USSR

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF-cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A program package intended for calculating azimuthal-symmetric modes in axisymmetric cavities as well as critical modes in longitudinally uniform waveguides. The discretization of electrodynamics equations uses eight-node quadrilateral isoparametric elements. The block power method for solving algebraic eigenvalue problems including estimations of convergence rate is used. To illustrate performance of the program and its separate units and estimate the accuracy, computing time, possibility of calculation oscillations with multiple eigenvalues, the program has been checked on problems having analytical solutions oscillations in spherical and cylindrical resonators, waves in a rectangular waveguide. It is concluded that frequency by the PRUD-0 program is more accurate than by the SUPERFISH program by approximately two orders.

Publications describing the code:


Is code documentation available? Yes No

How may the code be obtained? unknown

Source Language:

Computers it runs on:

Available as: Source code, Executable only

Source Media: Tape, Diskette, Cards, Networks

Available through: DECNET, ARPANET, BITNET

Network Address:
Program Name: PRUDOB

Date of Latest Version: unknown

Person to Contact: A G Abramov
Address: Institute for High Energy Physics
Serpukhov
USSR

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
The PRUDOB program package is intended for calculating the azimuthally homogeneous modes in accelerator periodic axially-symmetrical systems. The problem is reduced to determination of two real functions for the structure half-period. The package is oriented for the problems of determining the periodic structure dispersion characteristics.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained? unknown

Source Language:
Computers it runs on:
It is available as: Source code, Executable only
source Media: Listing, Tape, Diskette, Cards, Networks
Tape format: Diskette size & format:
Available through: DECNET, ARPANET, BITNET

Network Address:
Date of Latest Version: unknown

Person to Contact: A. Wulich
Address: DESY
    Yorkstrasse 45
    2000 Hamburg 52
    Fed. Rep. Germany

Telephone Number:

Classification of Computer Code:
Component Design:
    □ Ion Source, □ Magnet, □ RF-cavity, □
Accelerator Optimization:
    □ Linac, □ Cyclotron, □ Synchrotron, □
Tracking or Simulation:
    □ Linac, □ Cyclotron, □ Synchrotron, □
Analysis:
    □ Stability, □ Impedances, □
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
RACETRACK is a computer code to simulate transverse nonlinear particle motion in accelerators. Transverse magnetic fields of higher order are treated in thin magnet approximation. Multipoles up to 20 poles are included. Energy oscillations due to the nonlinear synchrotron motion are taken into account. Several additional features, as linear optics calculations, chromaticity adjustment, tune variation, orbit adjustment and others are available to guarantee a fast treatment of nonlinear dynamical problems.

Publications describing the code:
A. Wulich, 'RACETRACK - A Computer Code for the Simulation of Nonlinear Particle Motion in Accelerators,' DESY Internal Reports 84/07 and 84/020 (1984)

Is code documentation available?    Yes    No

How may the code be obtained?
unknown

Source Language: unknown

Computers it runs on:

It is available as:    Source code,    Executable only

Source Media:    Listing,    Tape,    Diskette,    Cards,    Networks

Tape format:

Diskette size & format:

Available through:    DECNET,    ARPA,    BITNET

Network Address:
Person to Contact: P. Spakle
Address: GSI
Postfach 10 73 17
64221 Darmstadt
Fed. Rep. Germany

Telephone Number: 061 21 357 423

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity, Electron gun

Accelerator Optimization:
- Linear, Cyclotron, Synchrotron

Tracking or Simulation:
- Linear, Cyclotron, Synchrotron, Beam transport lines

Analysis:
- Stability, Impedance

Other:

Short Description:
Purpose, capabilities, algorithms, special features, etc.
Simulations of electrons within electrostatic, magnetic fields. Electrostatic potentials are calculated exactly interactively. Menu-driven program including high resolution colored graphics. 2D code. Cylindrically symmetric.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
On request

Source Language: Machine Language

Computer it runs on: Commodore 64/128

It is available as:
- Source code, Executable only
- Source, Data, Listing, Tape, Diskette, Card, Network
- Tape format
- Diskette size & format: 5 1/4 IBM

Available through:
- DECNET, ARPANET, IEEE 41

Contact Name:
RAYTRACE is an on-line computer code, which numerically integrates the particle differential equations of motion through real fields and can be used to trace protons once or twice through a sequence of electromagnetic devices. The main types of elements that are presently supported include dipoles (version 1), quadrupoles (version 2), deflections, velocity filter, lens, and solenoid. For an on-line computer with a symmetry plane, the accuracy of the trajectory calculations in this plane is comparable to the accuracy of the description of the electric and magnetic fields, i.e. RAYTRACE computes to essentially infinite order. The field components for trajectories off this median plane for dipoles are described by a tenth-order Taylor series off-axis in quadrupoles the field is described by a Taylor series carried to at least fifth order.

Users of RAYTRACE practically always start with TRANSPORT to determine first and second-order parameters, in other words, the basic layout of the system. RAYTRACE is then used to fine tune the system. First and second-order parameters generally have to be readjusted slightly, and when dipoles are involved there are also third and higher-order adjustments, i.e. centering offsets. The major function of RAYTRACE, however, is to calculate higher-order aberrations in the optics, and to aid in correcting these aberrations, whenever possible. The program does not have a built-in automatic fitting routine for minimizing image aberrations, etc. It has been used as a subroutine for such programs.

Once the program traces one ray at a time it is not readily adaptable to handle space charge forces in the beam in systems with intense beams.

Publications describing the code:
1. [duplicate](1986) RAYTRACE: A computer code for high current charged particle accelerators, AIP Conf. Proc. to be published. Also, there is a MIT internal report.

Is code documentation available? Yes No

How may the code be obtained? All Rights Reserved. No copies or direct access to code which has been distributed.
Source language: FORTRAN

Computers it runs on: VAX

It is available as: x Source code, x Executable only

Source Media: x Listing, x Tape, x Diskette, x Cards, x Networks
    Tape format: x track, 1600 bpi
    Diskette size & format:

Available through: x DECNET, x ARPANET, x BITNET

Network Address: [Insert network address or site name]
Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
- Electrostatic devices

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

User-friendly interactive program which solves the Laplace-Poisson equation in 3D Cartesian or 2D cylindrical coordinate system with dielectric (2D only) by the method of successive over relaxation (finite difference). Problem cases are dynamically loaded from a user written subroutine describing the geometry. Contour plots of the potential distribution along any slice can be produced.

Publications describing the code:


Is code documentation available? *Yes* *No*

How may the code be obtained?
Contact Cees Kost

Source language: FORTRAN

Computers it runs on: VAX

It is available as:
- *Source code*
- *Executable only*

Source Media:
- Listing
- Tape
- Diskette
- Cards
- Networks

Available through:
- DECNET
- ARPANET
- BITNET

Network Address
Classifications of Computer Code:

Component Design:
- Non-Source,  Magnet,  RF cavity,

Accelerator Optimization:
- Linac,  Cyclotron,  Synchrotron,  Beamline transport

Tracking or Simulation:
- Linac,  Cyclotron,  Synchrotron,  beamline transport

Analysis:
- Stability,  Impedances,  

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
Second order Monte Carlo beam transport program which includes the effects of multiple scattering, decay, nuclear scattering, and energy loss. The program cannot optimize beam line elements and is thus primarily used to do detailed checks on a TRANSPORT designed beam line. Aberration coefficients (transfer matrices) can be calculated for the full beam line

Publications describing the code:

Is code documentation available?  x: Yes  ,  No

How may the code be obtained?
Contact Corin Kost

Source language:  FORTRAN

Computers it runs on:  VAX

Run available on:  x: Source code,  Executable only

Source Media:
- Listing,  Tape,  Diskette,  Cards,  Networks

Lape Format:  BINARY

Diskette size & format:

Available through:  DECNET,  ARPANET,  BINET

Network Address:
Date of Latest Version: Jan 1986

Person to Contact: Walter P. Eyenko

Address: MS H829, Group AF 6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: (505) 667 7431

Classification of Computer Code:

Component Design:
- Non Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc)

The RFQLIB system does particle tracing simulations for RFQ linear accelerators. The particle equations of motion are numerically integrated using time as the independent variable. The forces on the particles are computed in two subroutines. Subroutine FOR computes the external forces of the rf field in the RFQ. The RFQ parameters are stored in a table as a function of the longitudinal coordinate. Interpolation is used to get the parameters at given values of the synchronous particle position. Subroutine SC FOR computes the space charge forces by a particle-in-cell method using the electrostatic approximation. An rz Poisson solver is used with a conducting boundary at rz = const. and with periodic boundary conditions in the rz direction.

Publications describing the code:

GSI 84 11 (1984) 327

See also LANL Informal Report APD-ATN 84 4

Is code documentation available? Yes

How may the code be obtained?

Call Walter Eyenko.

Source Language: FORTRAN

Computers it runs on: CRAY

It is available as:
- Source code
- Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Tape format: whatever
Diskette format: whatever

Available through: DECnet, ARPANET, BBNnet

Network Address: WAP 1.0.3 8 in ARPA net
Classification of Computer Code:

Component Design:
- Ion Source, Magnet, RF cavity.

Accelerator Optimization:
- Linac, Cyclotron, Synchrotron.

Tracking or Simulation:
- Linac, Cyclotron, Synchrotron.

Analysis:
- Stability, Impedances.

Other:

Short Description (Purpose, capabilities, algorithms, special features, etc.):

It is a modeling program, which can be used:

- Offline as a design program (e.g., SYNCH, MAD etc.) or
- Online as a control program (When used as a control program, the program microprocessor interface is specific to the installation).

It has two major modules—one for

- Tuning and chromaticity optimization control and one for

  - Trajectory calculation correction control that uses the MCMDO algorithm for minimizing the orbit displacements around the ring.

In addition to the standard lattice elements (double-bend quadrupole modulators), various nonlinear lattices calculated as in LINAC-PROF. Chromaticity due to lenses is calculated via CHIL.

Machine and beam parameters, synchrotron integrals, damping partitions, rate of change of damping, harmonic energy spread, spatial beam size, with and without coupling, bunch length, quantum and bunch lifetime, etc., are calculated on demand.

Date of latest version: Jan 1985

Program name: CHIL

Person to contact: B. H. McGrew

Address: 1st Dept
Brookhaven National Laboratory
Upton, NY 11973

Telephone: 303-594-3501 ETS: 303-594-3501
How may the code be obtained?
Contact Eva Bozok

Source language: FORTRAN
Computers it runs on: DG

It is available as: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks
Tape format
Diskette size A format

Available through: DECNET, ARPANET, BITNET

Network Address: 
Date of Last Revision: Always

Person to contact: Bruce Carlson

Address: M/559C, ANL

Ames National Laboratory

700 24th Street

A

Telephone Number: 03/374 7177

Classification of Computer Code

Component Design:

Ion Source, Magnet, RF cavity, Kilovolt simulations

Accelerator Optimization

Ion, Cyclotron, Synchrotron

Tracking or Simulation

Ion, Cyclotron, Synchrotron

Analysis

Stability, Impedances, Other

Short Description of Purpose, capabilities, algorithms, special features, etc.

This model time is the independent parameter. This high signal beam frequency interaction simulations use also called "homogeneous wavelength" to ensure self-consistent particle motion. Iterations to ensure self-consistent cavity gap voltages and space charge.

Publications describing the code


Code documentation available: Yes, No

How can the code be obtained:

Contact correspondence

Copyright 1974

Copyright 1974

Copyright 1974

Copyright 1974
Date of Release: November 1983
Program Source:

Person to contact: M. Smith
Description: Computer Code

Classification of Computer Code:
Component Design
Ion Source, Magnet, RF cavity.

Accelerator Optimization
Linear Cyclotron, Synchrotron.

Tracking or Simulation
Linear Cyclotron, Synchrotron.

Analysis
Stability, Impedances.

Other

Short Description: Purpose, capabilities, algorithms, special features, etc.

MAGISK calculates the median plane magnetic field due to fully saturated iron poletips. Optionally, MAGISK calculates the magnetic field due to disks of magnetic charge, which can simulate the effect of holes in the iron pole tip or non-parallel iron rods embedded in the pole tips. MAGISK is intended for pole tip geometries that are both symmetric about the median plane and have azimuthal sector symmetry. Hence the program is primarily designed to simulate the magnetic field due to iron pole tips in superconducting magnets.

Publication: Describes the code


Code documentation available: Yes. No.

How may the code be obtained:

+ Source code on BRL CARY.
+ Code available on IBM 360.
+ Written in Fortran.


Yes, No.
Date of Latest Version

Person to contact for information
Address: University of Montana
Physics Department
Missoula, MT 59812
USA

Telephone Number: 406-243-9255

Classification of Computer Code
Component Design

- For Source
- Magnet
- RF cavity
- Charge Exchange solenoids

Accelerator Optimization
- Linear
- Cyclotron
- Synchrotron

Tracking of Simulation:
- Linear
- Cyclotron
- Synchrotron

Analysis
- Stability
- Impedances

Other

Short Description (Purpose, capabilities, algorithms, special features, etc)
The code traces macro-particles or macroparticles through electromagnetic fields with or without space charge. Fields may be analytical or tabulated and values. Input options for the particle distribution include measured IAR, Vol or Vvol in phase space.

Publications describing the code:
R. I. Hayden and M. E. Edelson: Macroparticle simulation: High current beam transport (HEFF Trans. 4: 266-276)

Code documentation available? Yes \[ Y \] No \[ N \]

How may the code be obtained?
- a) Write: Prof. Hayden, c/o Edelson, at above address

Copyright notice:
- a) copyright 1984

Optimization (A V)
- Remove code and/or source code

Supervision on A V
- Source code
- Lgpe

Availability of Code
- Source Code: \[ Y \]
- Executable only

Availability of Data
- Source: \[ Y \]
- Lgpe
- Bivariate
- Network

Availability of Literature
- \[ Y \]

...
Program Name: scott

Date of Latest Version: Apr 1998

Person to Contact: Ingo Hofmann
Address: GSI
         Postfach 10541
         D-61200 Darmstadt-11
         Fed. Rep. Germany

Telephone Number:

Classification of Computer Code:

Component Design:
  Ion Source, Magnet, U RF cavity

Accelerator Optimization:
  Linear, Cyclotron, Synchrotron

Tracking or Simulation:
  Linear, Cyclotron, Synchrotron, Storage Rings

Analysis:
  Stability, Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A 2D (x-y Cartesian) PIC code used for space-charge dominated beam transport studies. Recently used for studies of resonance crossing in storage rings under space-charge-dominated conditions. 2D trajectories, tracking

Publications describing the code:


Is code documentation available?  Yes  No

How may the code be obtained?

Source language: FORTRAN

Computers at user site: IBM 3080

Is available as:  Source code, Executable only

Source Media:  Listing, Tape, Diskette, Cards, Networks

Tape format:
  Diskette size & format:

Available through:  DECNET, ARPANET, BITNET

Network Address:  not given
Date of Latest Version: Apr 1988

Person to Contact: Ingo Holm

Address: csl
Postfach 110541
D-6000 Darmstadt, FRG
Fed. Rep. Germany

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron, Storage Rings

Analysis:
- Stability

Other:

Short Description: A particle-in-cell simulation code with 3D trajectorics and 2D Poisson solver. Conducting cylindrical pipe as boundary condition. A user-defined impedance can be included. Code has been used to study of bunching and the longitudinal microwave instability.

Publications describing the code:
- Holm, I. and I. Reink, Proc. of the Symposium on Accelerator Aspects of Heavy Ion Fusion, v. 1
  Darmstadt (1982) 181

Is code documentation available? Yes

How may the code be obtained?
Write to Ingo Holm

Source language: FORTRAN 77

Computers it runs on: IBM 3090 and CRAY

For availability as:
- Source code
- Executable only

Source Media:
- Listing
- Tape
- Diskette
- Cards
- Network

Tape format:
- Diskette size:

Available through:
- DEANET
- ARPANET
- BITNET

Network Address: 

Date of Latest Version: Aug 1985

Person to Contact: Robert Ryne, Robert Glicksman
Address: Dept. of Physics and Astronomy
University of Maryland
College Park, MD 20742
USA

Telephone Number: 301-454-7476

Classification of Computer Code:
Component Design:  
| 1 | Ion Source, 2 | Magnet, 3 | RF cavity, 4 |
Accelerator Optimization:  
| 1 | Linac, 2 | Cyclotron, 3 | Synchrotron, 4 |
Tracking or Simulation:  
| 1 | Linac, 2 | Cyclotron, 3 | Synchrotron, 4 |
Analysis:  
| 1 | Stability, 2 | Impedances, 3 |
Other: 

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

SHRIMP is a post-processor to the program SUPERFISH. SHRIMP computes the cavity frequency by a variational technique, using the fields calculated by SUPERFISH. The frequency computed by SHRIMP has an error of f x 10^{-2} (for an N x N mesh). Thus, by using SHRIMP as a post-processor, one can make the SUPERFISH mesh coarser, and still obtain comparable accuracy in f.

Publications describing the code:

Is code documentation available?  Yes [x] No

How may the code be obtained?

It is located in MASS under 1056805.5. SHRIMP (at Los Alamos National Laboratory). Contact the Los Alamos Accelerator Code Center (505) 667-6677 (or 667-2939), FTS 843 6677

Source language: FORTRAN

Computers it runs on: CRAY

It is available as: [x] Source code, [ ] Executable only

Source Media: [x] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format: [ ] DEC, [ ] IBM

Diskette format: [ ] A format

Available through: [DECNET, [ ] ARPANET, [ ] BITNET

Network Address: [ ]
Program Name: SIMTRAC

Person to Contact: Daniel Brandt
Address: CERN
             1211 Geneva 23
             Switzerland

Telephone Number:

Classification of Computer Code:
Component: ION Source, Magnet, RF cavity
Accelerator Optimization: Linac, Cyclotron, Synchrotron
Tracking or Simulation: Linac, Cyclotron, Synchrotron
Analysis: Stability, Impedances, Wakefield Effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

SIMTRAC is a simulation program for tracking longitudinal and transverse single bunch effects in a circular electron machine for a number N of superparticles. The program includes damping, collective effects such as transition, beam-loading of rf cavities and wakefields. For a typical run 1000 superparticles can be followed for around 5000 turns. Output includes beam dimensions every NREPR turns, phase space plots, bucket contours, and averages over a given number of turns.

Publications describing the code:


Is code documentation available? Yes No

How may the code be obtained?
Contact Daniel Brandt

Source Language: FORTRAN

Computer it runs on: IBM

It is available as: Source code, Executable only
Source Media: Tape, Diskette, Cards, Networks
Tape format: Diskette tape & format

Available through: DECNET, ARPANET, BITNET

Network Address:
Date of Latest Version: Apr 1986

Person to Contact: Gerhard Rudolf
Address: SIN
         CH 5234 Villigen,
         Switzerland

Telephone Number: 04128 39 1394

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linear, * Cyclotron
- Synchrotron
Tracking or Simulation:
- Linear
* Cyclotron
* Synchrotron
* Magnets

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
- Orbit calculations from magnetic field measurements, processing of magnetic field measurements in cylindrical coordinates

Publications describing the code:

Is code documentation available? * Yes * No

How may the code be obtained?
- Write to Gerhard Rudolf, SIN

Source language: FORTRAN 77

Computers it runs on: VAX, CDC 3600

It is available as: * Source code
- Executable only

Source Media: Listing, * Tape, Diskette, Cards, * Networks
- Tape format: Sun, harcum, 10 lines block
- Diskette size & format

Available through: DECNET, ARPANET, BBNET

Network Address:
Date of Latest Version: 1985

Person to Contact: Louis Hand
Address: Newman Laboratory of Nuclear Science
          Cornell University
          Ithaca, NY 14853
          USA

Telephone Number: (607) 255-6023 (off phone)

Classification of Computer Code:
  Component Design:
    Polar Source, Magnet, RF cavity
  Acceleration Optimization:
    Linear, Cyclotron, Synchrotron
  Tracking or Simulation:
    Linear, Cyclotron, Synchrotron
  Analysis:
    Stability, Impedances, depolarization
  Other

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
SLIM is a tracking code which includes spin-orbit interaction to calculate the depolarization of polarized beams due to closed orbit distortions caused by misalignments. It uses an 8x8 matrix formalism, and includes effects of radiation damping. Stability is determined by looking at the eigenvalues of the total transport system.

There exists documentation for the 1981 version of the code as written by Alex Cho. It is unknown whether B. Barber or L. Hand have updated the documentation.

Publications describing the code:


Code documentation available: Yes No

How may the code be obtained:


Language: C tolerates FORTRAN, BASIC
Computers it runs on: IBM

It is available as: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Tape format:

Diskette size & format:

Available through: DECNET, ARPANET, BITNET

Network Address:
Date of Latest Version: Mar 1982

Person to Contact: James R. Bramlet
Address: Org 2641 Building 91, Sandia National Laboratory, Albuquerque, NM 87185, USA

Telephone Number: 1 (505) 846-6162 ETS 74-6162

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
A digital computer program, SNOW has been developed for the simulation of dense ion beams. The program simulates the plasma expansion cup (but not the plasma source itself), the acceleration region, and a drift space with neutralization of desired. The ion beam is simulated by computing representative trajectories through the device. The potentials are calculated on a large rectangular matrix array which is solved by iterative techniques. Particle equation is solved at each point within the configuration using space charge densities computed from the ion trajectories combined with background electron and ion distributions. (Note that some changes have been made in the code recently that have not been documented. It may be difficult to run the code without personal help from Bramlet. Jack Beers is presently writing a new version of the code.)

Publications describing the code:
Jack F. Beers: SNOW - A Digital Computer Program for the Simulation of Ion Beam Devices, Sandia Laboratory Internal Report no. SAND 82-0191

Is code documentation available? Yes    No

How may the code be obtained:
- Contact John Bramlet at the above address or Jack Beers, Varian Corp., Gloucester, MA 01930. Phone 978-281-0000 ext 1441

Source Language: FORTRAN

Computer Systems: CRAY S.A.S.

Available on: Source code, Executable only

Source: Tape, Terminal, Diskette, Cards, Network

License Type: Diskette and/or Terminal

Available through: MIND I, ARPA-I, BION I

Copies Available:

Current Addio
Date of Latest Version: unknown

Person to Contact: ER Close
Address: Electra-on Road
Lawrence Berkeley Laboratory
Berkeley, CA 94720
FKE

Telephone Number: (415) 626-4185 FAX: (415) 626-4166

Classification of Computer Code:
Component Design:
- Ion Source
- Magnetic
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
- Beam Transport

Analysis:
- Stability
- Impedances

Other:
- Generate transport matrices from fields

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

In the design of beam transport systems, it is often desirable to generate transformation elements from a magnetic field by numerically integrating the orbits through the field. Such a transformation matrix is needed when only a measured field is available or when the effect of various trial magnetic fields is being investigated. Essentially, program TOFRM produces first- and second-order elements when an arbitrary magnetic field is given. The resulting transformation matrix is readily applicable to beam transport programs such as TRANSPORT.

TOFRM formulates a system of equations which, when integrated, produces the coordinates of the reference particle and of any nearby particles specified. Once this is completed, the program calculates (if requested) the first- and second-order transformation matrix elements using the reference orbit as the origin in a suitably chosen coordinate system.

Publications describing the code:


Note: Some information is available from the author.

How may the code be obtained?

unavailable
Source languages are:

Computers: it runs on DEC PDP 11/03.

It is available as:

Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Available through DECNET, ARPANET, BITNET

Network Address:
Classification of Computer Code:
Component Design:
Ion Source, Magnet, RF cavity.
Accelerator Optimization:
Lum. Cyclotron Synchrotron.
Tracking or Simulation:
Lum. Cyclotron Synchrotron Beamline.
Analysis:
Stability Impedances.
Other:
Short Description: "Purpose, capabilities, algorithms, special features, etc."
Calculates and plots the rms beam envelopes of continuous non-relativistic proton beam through various elements magnetic and electrostatic. Space-charge fields are included. Either the generalized Krylov subspace or Lanczos equations or those of Daughu may be used.
Publications describing the code:
URIP, INF, FNAL 3.141 4.142 5.142 6.142 7.142.
1. Code documentation available: Yes No.
How may the code be obtained:
contact with.
source language: FORTRAN.
Computer system: Any.
1. executable code ACM source code Executive code:
on 128K IBM time, 93K Tape Drucker Card Network.
1. executable format: FORTRAN.
1. source code format: FORTRAN.
Version reached: HPP-41 MP-31 41 63 141.
1. contact: Yes No.
Date of Latest Version: July 1975
Program Name: SUPERFISH

Person to Contact: U. Alvarez Accelerator Group
Address: MS 6329, Group AIL
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505-667-6557
488-844-657

Classification of Computer Code:
Component Design:
Ion Source, Magnet, \* RF cavity
Accelerator Optimization:
Linac, Cyclotron, \* Synchrotron
Tracking or Simulation:
Linac, Cyclotron, Synchrotron
Analysis:
Stability, \* Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The SUPERFISH package evaluates the eigenfrequencies and fields for arbitrary shaped 2-D waves along cartesian coordinates and 3-D axially symmetric cavities in cylindrical coordinates. The package contains codes to generate the mesh, plot fields and evaluate auxiliary quantities of interest to drift tube, storage ring, etc. transit time factors, power losses, effect of perturbations.

Publications describing the code:

1. code documentation available \* Yes \* No

How may the code be obtained?

Through tape or disk address specific version desired. 488-844-657 Telephone for instructions

Language: Fortran

Computer it runs on: 488-CRAY

Distribution mode: \* Source code \* Executable only

source Media: \* Diskette \* Tape

Exe Media: \* Diskette \* Tape

Exe Format: \* Executable \* Runnable

Available through: \* DECNET \* ARPANET \* BBN NET

Access Author: Michael M. Halbach
Date of Latest Version: April 1984

Program Name: CML

Person to Contact: Carl F. Jensen

Address: Fermilab

P.O. Box 500
Batavia, IL 60510

USA

Telephone Number: 312-289-3117

Classification of Computer Code:

Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrontron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrontron
- Colliding Beam

Analysis:
- Stability
- Impedances

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

A computer program to simulate colliding beam dynamics in the storage ring has been written. The first version of the program did not incorporate sextupoles but showed some of the characteristics measured in various machines in the past. The focus of the present work is the understanding of the effects of sextupoles on these results. To do this, thin sextupoles are added in two ways. The first employs a linear transfer-matrix/momentum kick algorithm for each lattice cell. The second method is to create an approximate second-order transfer map for the entire machine. While the first method is exact, it is slow for machine lattices with many sextupoles. The luminosities, beam sizes, and transverse distributions obtained. The beam-beam interaction is accomplished each turn by first calculating the beam-entrance and exit sizes and then using this information to determine the transverse kicks received by each test particle. The bunch positions and sizes are output each turn. In addition, the test particle positions are tunneled and accumulated in 100 turn intervals.

Radiation correction and damping are added to each test particle each turn in order to maintain the initial non-sloshing horizontal and vertical amplitudes. Since there are no energy oscillations, the contribution to the horizontal beam size from the horizontal off-energy function at the interaction is not replaced by additional radiation emittance.

The versions of the program were in FORTRAN, but the latest version has been optimized to run on the computer at Cornell. It contains FORTRAN/assembly language programming which is difficult to port to other machines.

Publication describing the code:

How may the code be obtained?

Call Gerry Jackson

Source language: FORTRAN - FPS

Computers it runs on: IBM FPS-264

It is available as:

- Source code
- Executable only

Source Media:

- Listing
- Tape
- Diskette
- Cards
- Networks

Tape format:

- Diskette size & format:

Available through:

- DECDNET
- ARPA-NET
- BBN-NET

Network Address
Person to Contact: Arthur S. Kenney
Address: Lawrence Berkeley Laboratory
1 Cyclotron Road
Building 46-311
Berkeley, CA 94720
USA
Telephone Number: (715) 486-5631, FTS (715) 486-5631

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
- Transport lines

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
SYNCH is a computer program for use in the design and analysis of synchrotrons, storage rings and transport lines. Lattices are defined by statements describing beampipes and their components, drifts, dipoles, quadrupoles, sextupoles, other beampipes, etc. Betatron functions and closed orbit distortions due to momentum deviation or misalignments can be obtained. Orbits and beam ellipses can be tracked, and emittances, damping time, etc., calculated. Design of machines is done by versatile fitting algorithms.

Publications describing the code:

Is code documentation available?  Yes  No

How may the code be obtained?
A. S. Kenney

Source Language: FORTRAN

Computer it runs on: VAX, VME

It is available as:
- Source code
- Executable only

Source Media:
- Tape
- Diskette
- Cards
- Network

Available through:
- DECNET
- ARPANET
- BBNNET

Network Address:
- HPF 741035 3 3
- MIDDLEBURG 650 1 3
- ARPA NET 1 3
Date of Latest Version: Jan 1986
Program Name: TRC

Person to Contact: Thomas Weiland
Address: Deutsches Elektronen-Synchrotron DESY
Hamburg 82
Federal Republic of Germany

Telephone Number: 49 40 8998-3198

Classification of Computer Code:

Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances
- Wakefield Effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRC1 analyzes the electromagnetic interaction between bunched beams of charged particles moving through cylindrically symmetric cavities by calculating wake fields. The default Gaussian shape function for the bunch may be replaced by a shape of the user's choice.

There are several post processors for TRC1. WAKCOR subtracts a tube wake field from the total wake. WAKEFS reads fields and wakes as saved at every time step and does a Fourier transformation. WAKOUT reads the wake field and prints it. It can also calculate the gradient impedance, plot the bunch density and normalize wakes to 1.

In addition, there are two variations of TRC1. TRC100 follows the progress of TEM waves launched into a structure, e.g., a series of waveguides connected by a vacuum pipe, from the left open boundary. TRC101 is the same as TRC100 except that TM01 waves are launched into the structure. TRC102 is the same as TRC101 except that TM01 waves are launched into the structure.

Publications describing the code:

Code documentation available: Yes

How may the code be obtained?
- One must get the source code directly from Thomas Weiland
- Executable form: The code is installed at Los Alamos and Lawrence Livermore National Laboratories. For more information on these contact Therese Bartsch at (805) 425 4400 at LBL.
Computers it runs on: CRAY VAX VMS, IBM 3081

It is available as: ☑ Source code, ☑ Executable only

Source Media: ☑ Listing, ☑ Tape, ☑ Diskette, ☑ Cards, ☑ Networks
Tape format: EBCDIC
Diskette size & format:
Available through: ☑ DECNET, ☑ ARPANET, ☑ BITNET

Network Address: mpwser@dlbhfcssy3.bitnet
Program Name: TEAPOT

Date of Last Amendment: 1975

Person to whom change may be sent: T. F. Edman
Address: LLNL
Lawrence Livermore Laboratory
Livermore, CA 94550

Telephone Number: 456-4566

Classification of Computer Code:

Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linear
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linear
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description (Purpose, capabilities, algorithms, special features, etc.)

TEAPOT (Thick Element Accelerator Program for Optics and Tracking), developed for design work on the supertech (LLNL) is a tracking code which treats all elements made from drift sections as thinline elements. TEAPOT reads a lattice in standard (MAD) input format and converts all thick elements to thinline ones. If a quadrupole is of "interaction region" type, it is split into four thin quadrupoles. TEAPOT neglects fringe fields. A various analysis can be performed and the tunes can be adjusted using a thin lens matrix representation of the machine. Magnetic errors and misalignments can be added to elements, and the resulting lattice can be tracked exactly. A full error analysis with errors is also available, which allows tracking to derive the transfer matrices for the machine. The machine can be decoupled using skew quadrupoles, the tunes can be readjusted, and the chromaticity can be fit in the presence of errors. The normal format for TEAPOT is a dialect of that used by MAD.

There exists a postprocessor called MATPOT that produces a third-order 4x4 matrix representation for the lattice. The output of MATPOT can be put into MARYLE for the calculation of various quantities such as chromaticity and nonlinear invariants. MATPOT was written by Etienne Forest.

Publication describing the code:
- Etienne Forest, LLNL Report 674103, 1975 (unpublished)
- Etienne Forest, LLNL Report 674104, 1975 (unpublished)

Documentation available:
- Yes
- No

How may the code be obtained:
- By LLNL personnel
- By LLNL personnel
- By LLNL personnel
Computers Group of the ASA and AIA

It is available as 
- Source code, 
- Executable only.

Source Media: 
- Listing, 
- Tape, 
- Diskette, 
- Cards, 
- Networks

Tape format: 
- Diskette tape format.

Available through: 
- DEFNET, 
- ARPANET, 
- BITNET

Network Addresses: 
- A Y LINDSAY, 
- LINDSAY undermine, 
- CSA, 
- carper, 
- millet, 
- LINDSAY undermine, 
- carper, 
- millet.
Date of Latest Version: 1986

Program Name: BOSTA 3D

Person to Contact: Alby Moloney
Address: Nuclear Fields 1A
Carwool Wood
Oxford OX2 8EF
England

Telephone Number: 672766

Classification of Computer Code:
Component Design
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization
- Linear
- Cyclotron
- Synchrotron

Tracking or Simulation
- Linear
- Cyclotron
- Synchrotron

Analysis
- Stability
- Impedances

Other

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

BOSTA 3 is a 3D code for magnetostatic and electrostatic fields. It is the most advanced program available for nonlinear magnetostatic field computation. It can be used for a wide range of applications including linear magnets, particle accelerators, electron lenses, and deflection magnets. It can also be used for non-destructive testing. BOSTA uses a discrete finite element model in order to solve the partial differential equations governing the behavior of a system.

The finite element mesh is formed from hexahedra with ruled faces which are automatically subdivided into elements. A 3D grid is created initially and this can then be swept through space thus creating 3D volumes. The sweep operations include translation, rotation, and projection.

One special feature is that the finite element mesh does not have to model the conductor. These can either be through the mesh quite accurately. The conductors are modeled using a set of primitive shapes that include approximated curved-sided hexahedra and more complex elements.

The mesh primitive blocks are assigned material names and geometric properties. For example, wire and wire form are provided for input. Non-linear constitutive relationships and feedback

function shapes and derivatives

are also used. These can be-used to model the response of an element. The type of element used must be continuous through the mesh. The use of higher-order elements in some situations may be important. The automatic mesh generation module is provided to give a balance between speed and accuracy.

The program is designed to work in a distributed computing environment. This allows the BOSTA program to be used in parallel between computers, and results can be collected automatically using a Fortran object library. The BOSTA program is structured such that the currently currently in parallelization. It is performed on particle accelerators.
Publications describing the code:
IEEE Proc. 115 4 278 3 1968
vector fields data sheet Ref 2311

Is code documentation available?  Yes  No

How may the code be obtained?
By license agreement with Vector Fields Ltd

Source language: FORTRAN 77

Computers it runs on: PRIME, VAX, IBM

It is available as:  ✔ Source code,  Executable only

Source Media:  Listing, ✔ Tape,  Diskette,  Cards,  Networks
Tape format:  As required
Diskette size & format:  8

Available through:  DECNET,  ARPANET,  BBNET

Network Address:  Contact Robert Flan Argoame Satl Lab (312) 972 5632
Date of Latest Version: Apr 1986

Person to Contact: The Los Alamos Accelerator Code Group
Address: MS BH20, Group AF 6
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505-667-7396, 505-667-7576 or 2839, FTS 813 6677

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrontron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrontron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRACE is an interactive, first order envelope-tracing, beam dynamics computer code with space-charge effects. It includes some unique features as well as a number of elements not commonly found in other beam transport programs such as the permanent magnet quadrupole (PMQ), radio frequency quadrupole (RFQ), RF gap, accelerator column, and accelerator tank. The code also has a number of fitting capabilities, allowing almost any element parameter in the beamline to be varied, including space charge. TRACE calculations provide immediate graphic display, including the beam envelope and the phase-space ellipses in the transverse dimensions. The program is easy to use and contains its own help package that lists all instructions necessary for input, calculations, and graphic output.

Publications describing the code:

Is code documentation available? ✔ Yes ❌ No

How may the code be obtained?
- Contact the Los Alamos Accelerator Code Group or D. Rushton (505) 667-7396 or (505) 813-7396

Source Language: FORTRAN

Computer Systems: IBM 3000, VAX 11/780

Site available at: ✔ Source code, ❌ Executable only

Source Media: ✔ Tape, Diskette, Cartridge, Networks, Tape Cartridge, Terminals, VAX

Documentation: ✔ Include in Report or Manual

Available through: ARPA NET, TELNET, BITNET

Network Address:
Date of Latest Version: Jan 1986

Person to Contact: The Los Alamos Accelerator Code Group
Address: MS B629, Group AF
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 505-667-6677 or 299-FTS 844 6677

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances, Other

Short Description: The purpose, capabilities, algorithms, special features, etc.
TRACF 3.4 is an interactive program that calculates the envelopes of a bunched beam including linear space change forced through a user-defined transport system. The transport system may consist of the following elements: 1) drift, 2) thin lens, 3) quadrupole, 4) permanent magnet quadrupole (PMQ), 5) solenoid, 6) doublet, 7) triplet, 8) bending magnet, 9) edge angle (for bend), 10) if gap, 11) radiofrequency quadrupole cell (RFQ), 12) rf cavity, 13) coupled cavity tank, 14) a user-defined element and 15) a coordinate rotation.

The beam is represented by a 6 x 6 x 6 x 6 matrix introduced by the TRANSPORT program defining a hyperellipsoid in six-dimensional phase space. The projection of this hyperellipsoid on any two-dimensional plane is an ellipse that defines the boundary of the beam in that plane. Using a sequence of matrix transformations, the beam can be "followed" between any two elements. The user can change any parameter and observe the effect on the beam envelopes and on the output beam ellipses. Also, several matching options are available that determine values for the ellipse parameters or for specified transport system parameters (such as quadrupole gradients) to meet specified objectives.

Publications describing the code:
- TR 311, TR 316, TR 317, TR 414, TR 415, TR 416, TR 417, TR 418
- TRACF 3.4 Documentation

Code documentation available: Yes / No

How can the code be obtained:
- Contact: The Los Alamos Accelerator Code Group
- Contact: Helen Stokes, MS B629, Group AF
- Contact: 505-667-6677 or 299-FTS 844 6677

Source language: FORTRAN

Computer platform: IBM

Available at: Los Alamos National Laboratory

Source Media: Listing, Tape, Diskette, Cards, Networks
Tape format:
Diskette size & format:

Available through: DECNET, ARPANET, BITNET

Network Address: lds@bitnet
Date of Latest Version: 1981

Program Name: TRAC

Person to Contact: Robert J. Lam

Address: Argonne National Laboratory
Argonne, IL 60439

USA

Telephone Number:

Classification of Computer Code:

Component Design:

- Non Source
- Magnet
- RF cavity

Accelerator Optimization:

- LINAC
- Cyclotron
- Synchrotron

Tracking or Simulation:

- LINAC
- Cyclotron
- Synchrotron
- Spectrometers

Analysis:

- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The TRACK BEAM commands of GEANT 3D are useful for tracking a charged particle through a magnetic field and plotting the path. It was felt the subroutines associated with these two commands would form a useful stand-alone program where the user supplied the magnetic field instead of the GEANT 3D calculated field. Hence, measured fields could also be used. The user supplied fields are stored on disk as a field map or as the edge field of a uniform field magnet. The graphic subroutines are written for use on the Tektronix 4012

Publications describing the code:

- Lam J. (1984) TRAC: A Program to Track Charged Particles Through a Magnetic Field and Plot the Path, Proc. of a Workshop on High resolution Large acceptance Spectrometers, Argonne National Laboratory, ANL-PHY 84-1 and CONF 8409123

Is code documentation available? Yes

How may the code be obtained?

- Contact Robert J. Lam

Source Language: FORTRAN

Computer Platforms: IBM

Is code available as:

- Source code
- Executable only

Tape format: IBM

Diskette format: IBM

Available through:

- DECNET
- ARPA
- BBN

Network Address: None
Date of Latest Version: unknown

Program Name: TRAJECTORY

Person to Contact: A. C. Paul
Address: MS 6126
Lawrence Livermore National Laboratory
Livermore, CA 94550
USA

Telephone Number: 415 423 3183 FTS 633 3183

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Lmac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Lmac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
An orbit and ion-optic matrix transport program originally used for the 184 inch LBL cyclotron

Transport matrix output can be used as input to TRANSPORT or OPTIC. 50 Kb memory, runs on

Lmac on CDC 6600

Will track protons and pions in the median plane of the cyclotron

Publications describing the code:
A. C. Paul, TRAJECTORY. An Orbit and Ion-Optic Matrix Program for the 184 inch Cyclotron.
Lawrence Berkeley Laboratory Report UCRL 19490 (1969)


Is code documentation available? Yes No

How may the code be obtained?

unknown

source language FORTRAN

Computer system on which code can run: LMAC/POS

Available media:
- Source code
- Executable only

source Media: Lmac, Tape, Diskette, Card, Network

Top format:
- Diskette, Tape format

Available timeshared: DOE/14, ARPA/14, BBN/14

Contact Address:
Date of Latest Version: unknown

Person to Contact: W. Gardner
Address: Rutherford Appleton Laboratories
Station HX
Chilton
OXFORD OX5
England

Telephone Numbert

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
- Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
- Beam Transport
- Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
- Beam Transport

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Program TRAMP was developed at Rutherford High Energy Laboratory by Gardner and Whiteside to provide solutions to problems encountered in beam transport design. It has been extensively modified by various experimenters to fit the needs of the computer facilities of their respective laboratories.

The LML version is capable of tracking and matching trajectories, beam profiles, or phase-space ellipses through a given beam transport system. Most beam elements are represented by 2x2 matrices for each plane, but the code handles sextupoles by integration of trajectories. Matching can be done on dispersion.

Publications describing the code:

Documentation available: Yes

How may the code be obtained?

Documentation may be obtained from RHL.

License agreement required:

Commercial code available:

Executable only
Date of Latest Version:  May 1985

Program Name: TRANSPORT

Person to Contact: Eva S. Bocki
Address: NELS Dept.
Brookhaven National Laboratory
Upton, NY 11973
USA

Telephone Number: 516-292-3701

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
- Transport lines

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
- Transport lines

Analysis:
- Stability
- Impedances

Other: Control

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Purpose: To provide a tool to examine and control of transport lines in terms of beam and machine parameters using the mathematical model of the system

It is a modeling program, which can be used

- off line as a design program (like, e.g., TRANSPORT) or
- on line as a control program (When used as a control program, the program microprocessor interface is specific to the installation)

The program can perform

- ellipse matching
- calculate control the orientation and shape of the phase space ellipse
- ellipse positioning
- calculate control the position of the center of the phase space ellipse
- beam steering

- a graphic display program for GFA-100 or 102 300 display system is also available

User data are read from input files. User-program interface is through screen and it is interactive. User's way to be directed the input and minimize the effort using data validation and default options

Publication describing the code:

- User documentation available
- Yes
How may the code be obtained?

Eva S. Frazon, "High Level Control Programs at NSLS" in Computing in Accelerator Design and Operation: 1983: 426

Source language: FORTRAN

Computers it runs on: DG

It is available as: □ Source code, □ Executable only

Source Media: □ Listing, □ Tape, □ Diskette, □ Cards, □ Networks

Tape format:

Diskette size & format:

Available through: □ DECNET, □ ARPANET, □ BITNET

Network Address:
Date of Latest Version: Jan 1986

Person to Contact: Mark S. de Jong
Address: Accel. Phys. Branch
         Chalk River Nuclear Laboratories
         Chalk River, Ontario K0J 1J0
         Canada

Telephone Number: 613 584 3311

Classification of Computer Code:
Component Design:
ION Source, I Magnet, I RF cavity, I
Accelerator Optimization:
Linac, I Cyclotron, I Synchrotron, I Beam Transport
Tracking or Simulation:
Linac, I Cyclotron, I Synchrotron
Analysis:
Stability, I Impedances, I
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
A beam transport design code with parametric optimization. The code analyzes the transport of charged particle beams through a user defined magnet system. Space charge effects may be included either in two dimensions, treating transverse forces only, or in three dimensions by treating both transverse and longitudinal forces on the beam. The magnet system parameters are varied (within user defined limits) until the properties of the transported beam and/or the system transport matrix match those properties requested by the user. The code uses matrix formalism to represent the transport elements and optimization is achieved using the variable metric method. For problems without space charge a first or second order matrix formalism can be selected. Any constraints that can be expressed algebraically may be included by the user as part of the design.

Publications describing the code:
R M Hutcheson and E A Heughway, Nuc Inst & Mtls A 197 (1984) 89-95

1. code documentation available? Yes          No

How may the code be obtained?
From Mark de Jong, or from Edward A Heughway, Mail 1829, Los Alamos National Laboratory
Los Alamos, NM 87545 (505) 438 4331  
FAX 844 2541

Source Language: FORTRAN 77

Computers it runs on: CDC, CMER, CRAY

It is available as: x Source code, x Executable only

Source Media: x Tape, x Diskette, x Cards, x Networks
Tape format: as listed
Diskette size: A format

Available through: DEF SFS, ARPANET, BBN NET

Network Address:
Date of Latest Version: June 1985

Person to Contact: DAVID C. CAREY

Address: Fermilab

P.O. Box 500

Batavia, Illinois 60510

Telephone Number: (630) 896-3639, FTS 350-1639

Classification of Computer Code:

Component Design:

- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:

- Linac
- Cyclotron
- Synchrotron
- Beam Line

Tracking or Simulation:

- Linac
- Cyclotron
- Synchrotron
- Beam Line

Analysis:

- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Beam line transfer matrix calculation and fitting program. Calculates floor coordinates, beam matrix, and first, second, and some third-order transfer matrices. Elements include bending magnet, quadrupole, sextupole, octupole, solenoid, and accelerating cavity. Can simulate misalignments, beam steering, and random errors for any beam line parameter. The code will accept input in the MAD format.

Publications describing the code:

- TRANSPORT manual SLAC-94, or NAL-91, or CERN 80-04

Is code documentation available?  Yes  No

How may the code be obtained?

Contact the Macromedia Program Library

Fermilab P.O. Box 500

Batavia, Illinois 60510

Source Language: FORTRAN

Computer: Runs on CDC IBM VAX

It is available as:

- Source code
- Executable only

Source Tapes, Listing, Tape, Diskette, Card, Networks

Tape format, disk format, network format

Diskette transfer format

Available through: DECNET, ARPANET, MCI NET

Network Address: 3090957 at Fermilab P.O. Box 500

Fermilab
Program Name: TRANSPORT (LBL Version)

Person to Contact: Arthur C. Paul
Address: MS L 628
Lawrence Livermore National Laboratory
P.O. Box 808
Livermore, CA 94550
USA
Telephone Number: 415-423-3187; FTS 543-3183

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Beam lines

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
Beam lines

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
TRANSPORT is a computer code for calculating properties of charged particle beam transport systems using the matrix method in a six-dimensional phase space and a version of TRANSPORT was translated into FORTRAN from the original BILGOL SLAC TRANSPORT. Some of the important additions are polygon transformation, ray tracing, particle separator, space charge, output plotting, interactive on-line calculations, and flexible data manipulation procedures.

Publications describing the code:

Is code documentation available? Yes

How may the code be obtained?

Source language:
Computers it runs on:
It is available as: Source code, Executable only
source Media: Listing, Tape, Diskette, Cards, Network
Tape format:
Diskette size & format:
Available through: DECNET, DARLANET, BITNET

Note of Address
Date of Latest Version: unknown

Person to Contact: Karl Bane
Address: Stanford Linear Accelerator Center
SLAC Bldg. 26
P.O. Box 9441
Stanford, CA 94309
USA
Telephone Number: (415) 495-3028, FTS 461-9300 ext. 2026

Classification of Computer Code:
Component Design:
- Non Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
- Wakefield Effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRANSYS is a code to calculate the frequencies of a large number of deflecting modes in a periodic array of rf cavities. Using these frequencies one can calculate the transverse wakefield forces on a bunch beam tending to cause beam breakup.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
- Call Karl Bane

Source language:

Computers it runs on:

It is available as: source code, Executable only

Data Media: Listing, Tape, Diskette, Cards, Networks

File format:
Diskette size & format

Available through: DECNET, ARPANET, BITNET

Network Address: TRANSC84 ACM VAX BIT


Date of Latest Version: unknown

Person to Contact: John R. Freeman
   Address: Org 1211, Bldg 900
   Sandia National Laboratory
   P.O. Box 5800
   Albuquerque, NM 87185
   USA
   Telephone Number: 505/844-5254, FTS 844-5254

Classification of Computer Code:
Component Design:
   Ion Source, Magnet, RF cavity
Accelerator Optimization:
   Linac, Cyclotron, Synchrotron
Tracking or Simulation:
   Linac, Cyclotron, Synchrotron
Analysis:
   Stability, Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
TRIDIF is a time-dependent diffusion version of the well known PANDIRA POISSON-TRIM triangular mesh magnet code. Modifications allow TRIDIF to treat field diffusion in materials with time-varying permeabilities. Good agreement between the measured and computed magnetic fields was found for a simple test experiment.

See also documentation on PANDIRA POISSON and TRIM

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
   Contact John Freeman, Ashgrove has left Sandia

Source Language:
Computers it runs on:
It is available as: Source code, Executable only
Source Media: Diskette, Card, Network
Image format:
Diskette size & format:
Available through: ARPA NET, BBN NET

Network Address:
Date of Latest Version: 1/25

Program Name: FRM - V.3.2

Person to Contact: Robert Lan 360
Address: Argonne National Laboratory
9700 S Cass Ave
Argonne, IL 60439
USA

Telephone Number: 312-572-6642 FTS 972-6632

Classification of Computer Code:

Component Design:

Ion Source, Magnet, RF cavity,

Accelerator Optimization:

Linac, Cyclotron, Synchrotron,

Tracking or Simulation:

Linac, Cyclotron, Synchrotron,

Analysis:

Stability, Impedances,

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

FRM = 2D magnetostatic code, FORGY = Force calculation on coils and steel

Publications describing the code:

Alan M. Winslow, FOCIL 78-41 (1965)

R. Lan, FRM, Unpublished User Guide

R. Lan, FORGY, ANL Internal Report Hk RL-24972

Is code documentation available? Yes No

How may the code be obtained?

Contact Robert Lan

Source Language: FORTRAN

Computer it runs on: IBM 370

Is available as: Source code, Executable only

Source Media: Listing, Tape, Diskette, Cards, Networks

Tape format: IBM 390, IBM 370, IBM 3490, SUN

Diskette size & format

Available through: DECNET, ARPANET, BITNET

Network Advice: }
Date of Latest Version: unknown

Person to Contact: T. Matsuo
Address: College of General Education
Osaka Univ.
Fukaura, Japan

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity.
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron.
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron, Beam Lines.

Analysis:
- Stability, Impedances.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

TRIO (Third Order Ion Optics) is a computer program for the calculation of ion trajectories; it is applicable to any ion optical system consisting of drift spaces, cylindrical or toroidal electric sector fields, homogeneous or inhomogeneous magnetic sector fields, magnetic and electrostatic (q) lenses. The influence of the fringe field is taken into consideration. The trajectory calculation can execute with accuracy up to third order. Any one of three dispersion bases; momentum, energy, mass and energy may possibly be selected.

Publications describing the code:


Is code documentation available? Yes No

How may the code be obtained?

unknown

Source Language:

Computers it runs on:

It is available at:

Source code: Executable only

Source Media: Setting, Tape, Diskette, Cards, Network.

Tape format:

Diskette format:

Available Through:

DECNET, ARPANET, BBNNET.

Network Address:
Date of Latest Version: Apr 1985

Person to Contact: Bev Leake

Address: Fermilab

P.O. Box 500

Batavia, IL 60510

USA

Telephone Number: 312-892-3639 FTS 450-3639

Classification of Computer Code:

Component Design:

Ion Source, Magnet, RF cavity.

Accelerator Optimization:

Linac, Cyclotron, Synchrotron.

Tracking or Simulation:

Linac, Cyclotron, Synchrotron, Beam line.

Analysis:

Stability, Impedances.

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

Simulation of single pass charged particle beam lines and spectrometers. Includes geometric terms and all order chromatic effects for individual quadrupoles, bending magnets, sextupoles, and solenoids. Accumulates effects regardless of order. Can make specified one- and two-dimensional histograms of particle coordinates at any location in a beam line.

Publications describing the code:

National Accelerator Laboratory internal report 64 (TURTLE manual).

Is code documentation available? Yes

How may the code be obtained?

M. Samara, Physics Library

Fermilab P.O. Box 500

Batavia, IL 60510

Source Language: C

Computer it runs on: IBM 303X

It is available as: Source code, Executable only


Tape format: most anything

Diskette: 5.25, 3.5

Available through: NUDEN, ARPA-NET, BURENET

Network Address: 

waseland
Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linear
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linear
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc)
ULTRAFISH computes the resonant frequencies and fields in an rf cavity which is a figure of revolution for azimuthally asymmetric modes. It will handle regions of different permeability and dielectric constant. It works for some geometries, but not others. The code has essential problems involving boundary conditions that have never been overcome.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
It is not available for distribution.

Source language:

Computers it runs on:

It is available as:
- Source code
- Executable only

source Media:
- Listing
- Tape
- Diskette
- Cards
- Networks
- Tape format
- Diskette size & format

Available through:
- DEFUFE
- ARPANET
- BBNET

Get read, write
Date of Latest Version: Jan 1986

Person to Contact: Thomas Wedland
Address: Deutsches Elektronen-synchrotron DESY

Telephone Number: 51 13 00 00

Classification of Computer Code:

- Component Design:
  - Ion Source
  - Magnet
  - RF cavity

- Accelerator Optimization:
  - Linac
  - Cyclotron
  - Synchrotron

- Tracking or Simulation:
  - Linac
  - Cyclotron
  - Synchrotron

Analysis:

- Stability
- Impedances
- Wave field effects

Program Name: \textit{CAF} 1

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

CAF can compute symmetric (in \( r \)) and asymmetric (in \( \phi \)) resonant modes in cavities and frequencies of longitudinally homogeneous fields in waveguides for axially symmetric accelerating structures. It uses a rectangular mesh. Only the electric field components in the \((r,z)\) plane are used for the calculation of the transverse modes instead of \( H_z \) & \( E_r \). The discretization is based on FFT/finite integration techniques described in the reference. Many modes are found on one pass.

Publications describing the code:

1. Wedland, Electronics & Communication (AFC) 31 (1977) 116
2. Wedland, Nucl. Inst. & Meth. 216 (1983) 129

Is code documentation available? \( \checkmark \) Yes \( \checkmark \) No

How may the code be obtained?

One must get the code directly from Thomas Wedland.

A portable form of the code is installed at Los Alamos and Lawrence Livermore National Laboratory. For more information on these contact Thomas Wedland, Office 451, Los Alamos.

Source Language: FORTRAN 77

Computer: Systems on VAX II, VAX 11/780, IBM 3081

Available in:

- Executable only
- Executable + source code

Source Media: (Tape, Diskette, Card, Teletype, Network)

In: Tape

Out: Tape, Diskette, Card

Available through: ARPA, LBL, NERSC

Contact: Thomas Wedland, Office 451, Los Alamos
Date of Latest Version: Apr 1986

Person to Contact: Thomas Wedland
Address: Deutsches Elektronen-Synchrotron (DESY)
Notkestrasse 85-87
Hamburg 52
Federal Republic of Germany

Telephone Number: +49 40 4793-111

Classification of Computer Code:
Component Design:
- Ion Source, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking or Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances, Wake field effects

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
PRME. A computer program to compute symmetric (n = 0) and asymmetric (n \neq 0) resonant modes in cavities and frequencies of longitudinally homogeneous fields in waveguides for cylindrically symmetric accelerating structures. It uses a triangular mesh instead of the rectangular mesh used by PRME.

Publications describing the code:
T. Wedland, Electronics & Communication (EET) 24 (1977) 116

Is code documentation available? Yes

How may the code be obtained?
One must get the code directly from Thomas Wedland.

For recent development of the code, it is installed at Los Alamos and Lawrence Livermore National Laboratories. For more information on these contact Theseus Barton: 405/493-3965 at Los Alamos National Laboratory.

Source Language: FORTRAN 77

Computer it runs on: VAX/VAX, VAX 11/750

Program available as: Source code

Platforms supported: VAX

Available through: MACMIL, ARPANET, NBS

For work@gate.org contact Charles Hartley.
Date of Latest Version: June 1986

Person to Contact: David W. Forslund
Address: MS E531, X-70
Los Alamos National Laboratory
Los Alamos, NM 87545
USA

Telephone Number: 674-6674, 4476 FTS 844-4476

Classification of Computer Code:
Component Design:
- Laser, Magnet, RF cavity
Accelerator Optimization:
- Linac, Cyclotron, Synchrotron
Tracking Simulation:
- Linac, Cyclotron, Synchrotron
Analysis:
- Stability, Impedances
Other: Laser-beam wave accelerators

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
WAVE is a 2D particle-in-cell code for self-consistently solving Newton's equations of motion and Maxwell's equations. It has application to space charge problems, plasma and analysis of laser-plasma interactions. It is portable to any installation. Partial documentation exists.

Publications describing the code:

Is code documentation available? X Yes  N No

How may the code be obtained?
X All David Forslund

Source Language: FORTRAN 77

Computer it runs on: IBM 360, CRAY XM

Is available as:
X Source code, Executable only

Source Media: Disk, Tape

Source formats:
X Tape format, User defined

Availability:
X DECNET, ARPANET, BITNET

Network Address: Internal area
Person to Contact: John M. Loweyt
Address: LEP Division
CERN
CH 1211 Geneva 23
Switzerland

Telephone Number: (022) 83 66 41 or 83 50 26

Classification of Computer Code:
- Component Design:
  - Ion Source, Magnet, RF cavity,
- Accelerator Optimization:
  - Linear, Cyclotron, • Synchrotron, •
  - Tracking or Simulation:
  - Linear, Cyclotron, Synchrotron,
- Analysis:
  - Stability, Impedances,
- Other: Electron storage ring performance, wiggles

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
WIGWAM evaluates the parameters and performance of electron positron storage rings in a very flexible way. It includes the effects and will calculate the excitations for normal dipole wiggles and nonlinear wigglers (combined function quadrupole-sextupole or dipole-octupole) using appropriate generalizations of the usual electron ring formula. The program will also optimize performance (e.g., maximize luminosity, minimize energy spread, etc.) by calculating appropriate schemes for varying damping partition numbers, coupling, wiggle fields, RF voltage, etc. It also produces the "loos" diagrams, which provide a global picture of the potential performance of a ring.

Although the program is still under development with a view to integration into the MAD environment, a working version is available.

Publications describing the code:
1. M. Loweyt, Luminosity and Energy Spread in LEP, CERN LEP TH 85-4 gives many examples of output
2. M. Loweyt, Description of the WIGWAM Program, CERN internal report LEP Note 82/1

Is code documentation available? • Yes • No

How may the code be obtained?
• Contact M. Loweyt

Source language: FORTRAN

Computes: It runs on IBM

It is available as: • Source code, Executable only

Source Media: • Diskette, • Tape, • Cartridge, • Networked

Tape format: • Diskette format

Available through: • CERN, • ARPANET • BBN

Note: Ask for CERN LEP/3321
Date of Latest Version: 1985

Program Name: WOLF

Person to Contact: K. Halbach
Address: Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720
USA

Telephone Number: (415) 486 5868, FTS 484 5868

Classification of Computer Code:

Component Design:
- Ion Source
- Magnet
- RF cavity

Accelerator Optimization:
- Linac
- Cyclotron
- Synchrotron

Tracking or Simulation:
- Linac
- Cyclotron
- Synchrotron

Analysis:
- Stability
- Impedances

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

The WOLF code solves POISSON's equation within a user-defined problem boundary of arbitrary shape. The code is compatible with ANSI FORTRAN and uses a two-dimensional Cartesian coordinate geometry represented on a triangular lattice. The vacuum electric fields and equipotential lines are calculated for the input problem. The user may then introduce a series of emitters from which particles of different charge-to-mass ratios and initial energies can originate. These non-relativistic particles will then be traced by WOLF through the user-defined region. Effects of ion and electron space charge are included in the calculation. A subprogram PISA forms part of this code and enables optimization of various aspects of the problem. The WOLF package also allows detailed graphics analysis of the computed results to be performed.

Publications describing the code:


Is code documentation available? [X] Yes [ ] No

How may the code be obtained?

K. Halbach, LBL, (415) 486 5011

Source Language: FORTRAN

Computers running on: VAX, CDC

It is available as: [X] Source code, [ ] Executable only

Source Media: [X] Tape, [ ] Diskette, [ ] Cards, [ ] Networks

Tape format: [X] Diskette format:

Available through: [X] DECNET, ARPANET, BITSNET

Network Address:
Date of Latest Version: June 1986

Person to Contact: Michael S. Zisman
Address: Mail Stop 47-112
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720

Telephone Number: (415) 486-5785, FTS 451 5785

Classification of Computer Code:

Component Design:
- [ ] Ion Source, [ ] Magnet, [ ] RF cavity, [ ]

Accelerator Optimization:
- [ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Tracking or Simulation:
- [ ] Linac, [ ] Cyclotron, [ ] Synchrotron, [ ]

Analysis:
- [ ] Stability, [ ] Impedances, [ ] Intra-Beam Scattering (IBS) effects,
  Lifetimes (Touschek, gas scattering)

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)

ZAP can be used to calculate single bunch instability thresholds and instability growth rates from coupled bunch instabilities in storage rings, bunch lengthening, Touschek and gas scattering lifetimes, equilibrium emittances for electron beams in the presence of radiation damping, quantum fluctuations and inelastic scattering. It is an interactive, self-prompting code.

Publications describing the code:
Lawrence Berkeley National Laboratory Report no. LBL 21270

Is code documentation available? [x] Yes  [ ] No

How may the code be obtained?
From Michael S. Zisman.

Source language: FORTRAN 77

Computers it runs on: VAX, Vaxica

It is available as: [ ] Source code, [ ] Executable only

Source Media: [ ] Listing, [ ] Tape, [ ] Diskette, [ ] Cards, [ ] Networks
Tape format:
- Diskette size & format: RX50

Available through: [ ] DECNET, [ ] ARPANET, [ ] BITNET

Network Address: EGAZ4; Zisman code B 1981

zisman@labnets
zisman@labnet
Person to Contact: Curr Sawyer
Santa Barbara Operations
Goleta, CA 93117
USA

Telephone Number:

Classification of Computer Code:
Component Design:
- Ion Source
- Magnet
- RF cavity
Accelerator Optimization:
- Linear
- Cyclotron
- Synchrotron
Tracking or Simulation:
- Linear
- Cyclotron
- Synchrotron
Analysis:
- Stability
- Impedances
- Space Charge

Other:

Short Description: (Purpose, capabilities, algorithms, special features, etc.)
ZEFIELD, a trajectory computer code for a linear beam, has been written as a design aid to complement the TRANSPORT code. It includes space charge, plots the emittance change at axial values and plots beam radius. Comparing ZEFIELD and TRANSPORT in drift regions, significant differences in beam radius predictions are found in the 2 MeV region for currents above 200 A and above 499 A in the 4 MeV region. Using ZEFIELD beam envelope growth for beams with different emittances can be compared and the effect of space charge on emittance growth can be shown graphically.

Publications describing the code:

Is code documentation available? Yes No

How may the code be obtained?
unknown

Source Language:
Computers it runs on:

Data available as:
- Source code
- Executable only

Source Media:
- Taping
- Diskette
- Cards
- Networks

Tape format:
Diskette format:

Available through:
- DECNET
- ARPANET
- BBNET

Network Address:

A(1)