

PACKAGE ID - 000340MNF00 TRANSPORT

KWIC TITLE - Design of Charged Particle Beams

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LIMITATION CODE -UNL **AUDIENCE CODE** - UNL

COMPLETION DATE - 01/01/1986 **PUBLICATION DATE** - 01/01/1986

DESCRIPTION - The first, second, and third order optical properties of static-magnet charged particle beam transport systems are analyzed. The program can vary some of the physical parameters of the elements comprising the system and impose various constraints on the beam design and allows the user to put a random error on any physical parameter.

PACKAGE CONTENTS - Media Directory; SLAC-91, Rev.2; Software Abstract;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - The user describes the beam line as a sequence of elements which may be magnets, the intervals between them or special configurations of the magnets, specifications of the input beam, calculations to be done, and printout required. The program steps through the beam line calculating the appropriate transfer matrix for each element and the products of these matrices.

COMPUTER - MAINFRAMES

OPERATING SYSTEMS - VMS 4.2 (DEC VAX11), VM,CMS (IBM 4331)

PROGRAMMING LANGUAGES - FORTRAN 77

SOFTWARE LIMITATIONS - The effects of space charge are assumed to be negligible.

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - TURTLE is a ray tracing program which uses input compatible with TRANSPORT. TURTLE takes into consideration some higher-order effects that TRANSPORT cannot calculate. The original first-order TRANSPORT computer program was written in BALGOL by C.H. Moore at SLAC in collaboration with H.S. Butler and S.K. Howry in 1963.

OTHER PROG/OPER SYS INFO - Transfer matrices are written on FORTRAN logical unit 4.

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HARDWARE REQS - 990K bytes of memory on an IBM 4331, 335K bytes on a DEC VAX11/780.

TIME REQUIREMENTS - Running time is dependent on the number of elements in the beam line. The NESC executed the sample problems in 90 CPU seconds on an IBM4331 and DEC VAX11/780.

REFERENCES - K.L. Brown, F. Rothacker, D.C. Carey, and Ch. Iselin, TRANSPORT A Computer Program for Designing Charged Particle Beam Transport Systems, SLAC-91, Rev. 2, May 1977 (also published as CERN-73-16 and NAL-91), and Appendix, December 1977\ David C. Carey, New Features in TRANSPORT, Fermi National Accelerator Laboratory Technical Memorandum, TM-1064, September 7, 1981; Karl L. Brown, A First and Second-order Matrix Theory for the Design of Beam Transport Systems and Charged Particle Spectrometers, SLAC-75, Rev. 3, August 1972; David C. Carey, TURTLE (Trace Unlimited Rays Through Lumped Elements), A Computer Program for Simulating Charged Particle Beam Transport Systems, NAL-64, May 1978.

ABSTRACT STATUS - Abstract first distributed November 1978. IBM370 version submitted July 1975, replaced by revised Edition B October 1982, sample problems executed by NESC February 1986 on an IBM4331 and a DEC VAX11/780.

SUBJECT CLASS CODE - V

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
T CODES
BEAM OPTICS
BEAM TRANSPORT
TRANSFER MATRIX METHOD
CHARGED-PARTICLE TRANSPORT
MAGNETS
ACCELERATORS
BEAM DYNAMICS
PHASE SPACE

EDB SUBJECT CATEGORIES -
990200 430303

SPONSOR - DOE/NE

PACKAGE TYPE - TESTED