

**Fermilab**

CONVERSION OF PROGRAM CASIM TO CDC CYBER COMPUTERS

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The Monte Carlo Code CASIM¹ and its derivatives² are presently operative on the FNAL CDC Cyber computers. Previously they ran principally on IBM equipment³. The conversion was readily accomplished following implementation of the FTN5 compiler on the Cybers. All double precision variables, constants and functions of the IBM version are changed to single precision in the Cybers.

For comparison a full length test calculation was run on both installations. This test consists of computing energy deposition in a superconducting magnet string when a 350 GeV/c proton beam strikes an upstream target. Expressly for this test a machine independent random number generator is used. In addition, the random number seeds are resynchronized at frequent intervals throughout the calculation to suppress divergences of the random number call sequence.⁴ Such divergences are otherwise expected to occur since effects of rounding, intrinsic function differences, etc. will occasionally influence the call sequence. The IBM version uses full double precision (via the AUTODBL option of FORTRAN IV H Extended) for closer arithmetical compatibility.

The computed energy depositions are identical to three significant digits in both runs for all of some 1800 volume bins throughout the problem geometry.

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As compared with the standard (mainly single precision) IBM version, central processor times are typically about 15% larger on the FNAL Cybers than on the IBM 370/195. Storage requirements are about 10% less on the Cybers.

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References

1. A. Van Ginneken, FNAL-FN-250 (1975)
2. These derivatives include MAXIM which incorporates the program AEGIS for electromagnetic showers and tracing through arbitrary magnetic fields, a version which produces and tracks muons and a variant which computes soil activation using an integral estimator.
3. An earlier version of CASIM was converted for CDC FTN4 use by D. Steele and R. Ponzini of Kaman Sciences, Colorado Springs, CO. This version was implemented at Brookhaven and recently also at Fermilab.
4. A. Van Ginneken, FNAL-TM-657 (1976)