



REPORT CURSES (Foiled Again)
 (Program 283)
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 Computer Program
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CURSES, a program which computes the effect of multiple scattering of a beam of particles due to a foil (presently of copper only) of thickness X, has been written for A. Galonsky and S. Rosen. It calculates the position of a particle in the phase space of a linear betatron oscillation after the

n^{th} foiling as:

$$\sum_{j=1}^n a_j e^{i2\pi\nu(n-j)} + a_n$$

where ν is the betatron time.

The recursion formulas for P_n and X_n are:

$$P_n = P_{n-1} \cos 2\pi\nu - X_{n-1} \sin 2\pi\nu + a_n$$
$$X_n = X_{n-1} \cos 2\pi\nu + P_{n-1} \sin 2\pi\nu$$

These positions are out to a judiciously chosen limit on n or until the following condition is met:

$$|\sum|^2 \geq A^2$$

where A is proportional to ν times the stability limit of the accelerator; ie., the particle becomes unstable when the condition is fulfilled.

The a_n 's are picked randomly from a Molieré distribution which is a function of X, the foil thickness.

Input parameters at the users disposal are:

- 30 ID
- 31 N_k the number of kicks (foiling) per print
- 32 N_p the number of particles per run
- 33 A the limit on particle excursions
- 34 X the foil thickness
- 35 18 + 1
- 36 ν the tune
- 37 1 - 1
- 38 2 - 1
- 39 L the limit on n

The total number of kicks, P , X , Z , Θ , and Z^2 are printed each N_k kicks. This printing may be suppressed by raising sense switch 2.

The same information is printed when A is exceeded.

After N_p particles have been run, a table of the numbers of particles which exceeded A between print steps (N_k kicks) is presented.

TIMING

2 SECONDS / KILO-PARTICLE - kicks for $z=0$

4 SECONDS / KILO-PARTICLE - kicks for $z \neq 0$
