pp00aa

Constructs Poincaré plot and “approximate” rotational-transform (driver).

[called by: xspech.] [calls: pp00ab.]

contents

1 pp00aa 1
1.1 relevant input variables . . . 1
1.2 format of output: Poincaré . . . 1
1.3 format of output: rotational-transform . . . 2

1.1 relevant input variables

1. The resolution of Poincaré plot is controlled by

   i. nPtraj trajectories will be located in each volume;

   ii. nPpts iterations per trajectory;

   iii. odetol o.d.e. integration tolerance;

2. The magnetic field is given by bfield.

3. The approximate rotational transform is determined, in pp00ab, by fieldline integration.

1.2 format of output: Poincaré

1. The Poincaré data is written to `.ext.poincare:xxxx`, where `xxxx` is an integer indicating the volume. The format of this file is as follows:

```
write(svol,'(i4.4)')lvol ! lvol labels volume;
open(lunit+myid,file="."//trim(ext)//".poincare."//svol,status="unknown",form="unformatted")
do until end of file
 write(lunit+myid) Nz, nPpts                ! integers
 write(lunit+myid) data(1:4,0:Nz-1,1:nPpts) ! doubles
enddo
close(lunit+myid)
```

   where

   i. $\theta \equiv$ `data(1,k,j)` is the poloidal angle,

   ii. $s \equiv$ `data(2,k,j)` is the radial coordinate,

   iii. $R \equiv$ `data(3,k,j)` is the cylindrical R,

   iv. $Z \equiv$ `data(4,k,j)` is the cylindrical Z,

2. The integer `k=0,Nz-1` labels toroidal planes, so that $\phi = (2\pi/\texttt{Nfp})(k/\texttt{Nz})$,

3. The integer `j=1,nPpts` labels toroidal iterations.

4. Usually (if no fieldline integration errors are encountered) the number of fieldlines followed in volume `lvol` is given by $N+1$, where the radial resolution, $N \equiv$`Ni(lvol)`, is given on input. This will be over-ruled by if `nPtrj(lvol)`, given on input, is non-negative.

5. The starting location for the fieldline integrations are equally spaced in the radial coordinate $s_i = s_{l-1} + i(s_l - s_{l-1})/N$ for $i = 0, N$, along the line $\theta = 0$, $\zeta = 0$.

1.3 format of output: rotational-transform

1. The rotational-transform data is written to `.exttransform:xxxx`, where `xxxx` is an integer indicating the volume. The format of this file is as follows:

```
open(lunit+myid,file="."//trim(ext)//".sp.t."//svol,status="unknown",form="unformatted")
write(lunit+myid) lnPtrj-ioff+1                                       ! integer
write(lunit+myid) diotadxup(0:1,0,lvol)                               ! doubles
write(lunit+myid) ( fiota(itrj,1:2), itrj = ioff, lnPtrj ) ! doubles
close(lunit+myid)
```