

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. $\theta \equiv \text{data}(1,k,j)$ is the poloidal angle,
 - ii. $s \equiv \text{data}(2,k,j)$ is the radial coordinate,
 - iii. $R \equiv \text{data}(3,k,j)$ is the cylindrical R ,
 - iv. $Z \equiv \text{data}(4,k,j)$ is the cylindrical Z ,
2. The integer $k=0, Nz-1$ labels toroidal planes, so that $\phi = (2\pi/Nfp)(k/Nz)$,
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)
```