ra00aa

Writes vector potential to .ext.sp.A .

[called by: preset and xspech.] [calls: .]

contents

1.1 representation of vector potential

1. The components of the vector potential, $\mathbf{A} = A_\theta \nabla + A_\zeta \nabla \zeta$, in the v-th volume are

$$A_\theta(s,\theta,\zeta) = \sum_{i,l} A_{\theta,e,v,i,l}\, \overline{T}_{l,i}(s) \cos\alpha_i + \sum_{i,l} A_{\theta,o,v,i,l}\, \overline{T}_{l,i}(s) \sin\alpha_i, \tag{1}$$

$$A_\zeta(s,\theta,\zeta) = \sum_{i,l} A_{\zeta,e,v,i,l}\, \overline{T}_{l,i}(s) \cos\alpha_i + \sum_{i,l} A_{\zeta,o,v,i,l}\, \overline{T}_{l,i}(s) \sin\alpha_i, \tag{2}$$

where $\overline{T}_{l,i}(s) \equiv \bar{s}^{m_i/2} T_l(s)$, $T_l(s)$ is the Chebyshev polynomial, and $\alpha_j \equiv m_j\theta - n_j\zeta$. The regularity factor, $\bar{s}^{m_i/2}$, where $\bar{s} \equiv (1+s)/2$, is only included if there is a coordinate singularity in the domain (i.e. only in the innermost volume, $v = 1$, and only in cylindrical and toroidal geometry.)

1.2 file format

1. The format of the files containing the vector potential is as follows:

```
open(aunit, file="."//trim(ext)//".sp.A", status="replace", form="unformatted" )
write(aunit) Mvol, Mpol, Ntor, mn, Nfp ! integers;
write(aunit) im(1:mn) ! integers; poloidal modes;
write(aunit) in(1:mn) ! integers; toroidal modes;
do vvol = 1, Mvol ! integers; loop over volumes;
write(aunit) Lrad(vvol) ! integers; the radial resolution in each volume may be different;
do ii = 1, mn
write(aunit) Ate(vvol,ii)%s(0:Lrad(vvol)) ! reals;
write(aunit) Aze(vvol,ii)%s(0:Lrad(vvol)) ! reals;
write(aunit) Ato(vvol,ii)%s(0:Lrad(vvol)) ! reals;
write(aunit) Azo(vvol,ii)%s(0:Lrad(vvol)) ! reals;
enddo ! end of do ii;
enddo ! end of do vvol;
close(aunit)
```