

**bnorml**

Computes  $\mathbf{B}_P \cdot \mathbf{e}_\theta \times \mathbf{e}_\zeta$  on computational boundary,  $\partial\mathcal{D}$ .

[called by: [xspech](#).] [calls: [coords](#) and [casing](#).]

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**1.1 free-boundary constraint**

- 1. The normal field at the computational boundary,  $\partial\mathcal{D}$ , should be equal to  $(\mathbf{B}_P + \mathbf{B}_C) \cdot \mathbf{e}_\theta \times \mathbf{e}_\zeta$ , where  $\mathbf{B}_P$  is the “plasma” field (produced by internal plasma currents) and is computed using virtual casing, and  $\mathbf{B}_C$  is the “vacuum” field (produced by the external coils) and is given on input.
- 2. The plasma field,  $\mathbf{B}_P$ , can only be computed after the equilibrium is determined, but this information is required to compute the equilibrium to begin with; and so there is an iteration involved.
- 3. Suggested values of the vacuum field can be self generated; see [xspech](#) for more documentation on this.

**1.2 compute the normal field on a regular grid on the computational boundary**

- 1. For each point on the computational boundary, [casing](#) is called to compute the normal field produced by the plasma currents.
- 2. (There is a very clumsy attempt to parallelize this which could be greatly improved.)
- 3. An FFT gives the required Fourier harmonics.