metrix

Calculates the metric quantities required for volume integrals.

[called by: ma00aa.] [calls: coords.]

contents

1.1 metrics

1. The Jacobian, $\sqrt{g}$, and the 'lower' metric elements, $g_{\mu\nu}$, are calculated by coords, and are provided on a regular grid in 'real-space', i.e. (θ, ζ), at a given radial location, i.e. where s is input.

1.2 plasma region

1. In the plasma region, the required terms are $\bar{g}_{\mu\nu} \equiv g_{\mu\nu}/\sqrt{g}$.

$$\begin{aligned}
\sqrt{g}\, g^{ss} &= \left(g_{\theta\theta}g_{\zeta\zeta} - g_{\theta\zeta}g_{\theta\zeta}\right)/\sqrt{g} \\
\sqrt{g}\, g^{s\theta} &= \left(g_{\theta\zeta}g_{s\zeta} - g_{s\theta}g_{\zeta\zeta}\right)/\sqrt{g} \\
\sqrt{g}\, g^{s\zeta} &= \left(g_{s\theta}g_{\theta\zeta} - g_{\theta\theta}g_{s\zeta}\right)/\sqrt{g} \\
\sqrt{g}\, g^{\theta\theta} &= \left(g_{\zeta\zeta}g_{ss} - g_{s\zeta}g_{s\zeta}\right)/\sqrt{g} \\
\sqrt{g}\, g^{\theta\zeta} &= \left(g_{s\zeta}g_{s\theta} - g_{\theta\zeta}g_{ss}\right)/\sqrt{g} \\
\sqrt{g}\, g^{\zeta\zeta} &= \left(g_{ss}g_{\theta\theta} - g_{s\theta}g_{s\theta}\right)/\sqrt{g}
\end{aligned} \tag{1}$$

1.3 FFTs

1. After constructing the required quantities in real space, FFTs provided the required Fourier harmonics, which are returned through global. (The "extended" Fourier resolution is used.)