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ERRATUM

Direct construction of optimized stellarator shapes. Part 3. Omnigenity near the magnetic axis – ERRATUM

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Below we clarify the conventions used for normalization in our paper (Punk, Landreman & Herlander 2019), and correct some associated errors in the equations. The validity of the numerical solutions and the main conclusions of the paper are unaffected by these corrections.

Following Garren & Boozer (1991), we define the expansion parameter as $\epsilon = \sqrt{\psi}$ so that the magnetic field can be expressed to first order as $B(\epsilon, \theta, \varphi) \approx B_a(\varphi)(1 + \epsilon\sqrt{2/B_a(\varphi)}\kappa^s(\varphi)\eta_{\mathrm{GB}}(\varphi)\cos[\theta - \alpha(\varphi)])$, where the '$\eta$' of Garren & Boozer (1991) is here denoted η_{GB}; see their (79). For simplicity, we introduced the quantity d, related to η_{GB} by

$$d(\varphi) = \sqrt{\frac{2}{B_a(\varphi)}}\,\kappa^s(\varphi)\eta_{\mathrm{GB}}(\varphi), \tag{0.1}$$

so that the magnetic field to first order becomes

$$B(\epsilon, \theta, \varphi) \approx B_a(\varphi)\left(1 + \epsilon d(\varphi)\cos[\theta - \alpha(\varphi)]\right), \tag{0.2}$$

as correctly written in (6.1) of our paper.

Our definitions for d and ϵ affect the forms of the first order components of the coordinate mapping, X_1 and Y_1. These quantities are introduced in the text at the beginning of § 7, where the the coordinate mapping $\boldsymbol{x}$ to first order should read

$$\boldsymbol{x} \approx \boldsymbol{r}_0 + \epsilon(X_1\boldsymbol{n}^s + Y_1\boldsymbol{t}^s). \tag{0.3}$$

Note the factor of ϵ is missing in the paper. The form of X_1 was correctly given by (7.1), but that for Y_1, (7.2), should read

$$Y_1 = \frac{2}{B_a(\varphi)\bar{d}(\varphi)}\{\sin[\theta - \alpha(\varphi)] + \sigma(\varphi)\cos[\theta - \alpha(\varphi)]\}, \tag{0.4}$$

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with the correction being the factor of $1/B_a(\varphi)$.

Our forms of B, X_1 and Y_1 can be compared with (79)–(81) of Garren & Boozer (1991), and can be seen to agree, given our definitions of ϵ, d and $\bar{d}$, and the substitution $\kappa \to \kappa^s$. A related error was introduced into the definition of P immediately following (7.7), which should read

$$P = 1 + B_a^2 \bar{d}^4/4. \tag{0.5}$$

The solutions presented in § 8 remain valid, but we note that d defined in (8.4) (also depicted in figure 2*b*) misses a factor of $\sqrt{2}$, and should read

$$d(\varphi) = \sqrt{2}\,[1.08\sin(\varphi) + 0.26\sin(2\varphi) + 0.46\sin(3\varphi)]\,. \tag{0.6}$$

Finally, there is a typo, unrelated to the preceding issues: following (7.10) it should read $\Delta\varphi(\varphi) = \varphi - \varphi_b(\varphi)$.

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