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Errata

Journal of Plasma Physics, Volume 66 Correction to "A general theory of self-similar expansion waves in MHD flows"

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Taylor and Cargill (2001) presented a general theory of expansion waves in MHD flows. On page 243 we defined the magnetic field in the r-θ plane as $\mathbf{B} = (B_r(\theta), B_\theta(\theta), B_z(\theta))$, and $\mathbf{V} = (V_r(\theta), V_\theta(\theta), 0)$. It has been pointed out to us that this assumption is in general inconsistent with the z-component of the momentum equation. In particular, equation (15) on page 243 should be replaced by:

$$B_\theta \frac{dB_z}{d\theta} = \mu_0 \rho V_\theta \frac{dV_z}{d\theta} \tag{1}$$

In addition, for a steady-state situation and ideal MHD (i.e. $\mathbf{E} = -\mathbf{v} \times \mathbf{B}$), the z-component of Faraday's law is:

$$V_\theta \frac{dB_z}{d\theta} = B_\theta \frac{dV_z}{d\theta} - B_z \left[\frac{dV_\theta}{d\theta} + V_r \right] \tag{2}$$

From equations (1) and (2), it is clear that one can assume $V_z = 0$ only if $B_\theta = 0$ or $B_z = 0$. [In fact V_z can be an arbitrary constant in both cases that can be set to zero for simplicity.] The case $B_\theta = 0$ was assumed in Section (4.1) and $B_z = 0$ in the remaining Sections. In addition, the assumption $B_z = 0$ is stated clearly on page 243 below equation (15). Thus all the results of this paper are unaltered.

We thank Dr K. Kabin for drawing this point to our attention.

References

Taylor, M. G. G. T. and Cargill, P. J. 2001 A general theory of MHD self-similar expansion waves in magnetohydrodynamic flows. *J. Plasma Phys.* **66**, 239–257.
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