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Erratum: Role of inertia for the rotation of a nearly spherical particle in a general linear flow [Phys. Rev. E 91, 053023 (2015)]

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In this paper we investigated the role of inertia for the rotation of a nearly spherical particle in a general linear time-independent flow. As we continued to work on related questions we realized that the argument used in this paper to show that Eq. (7) evaluates to zero is valid for a constant shear flow, but not in general. This implies that our results for the shear flow [Eq. (22)] are correct and consistent with the results of Refs. [1–3]. But for other linear flows Eq. (7) may give rise to additional contributions to the angular particle velocity [Eq. (19)]. As a consequence, Eq. (23b) for the case of a purely rotational flow is replaced by $\dot{\theta} = (\epsilon/30)[\mathrm{St} - \mathrm{Re}_s]\sin 2\theta$. The right-hand side of this equation evaluates to zero for neutrally buoyant particles ($\mathrm{St} = \mathrm{Re}_s$). This means that a neutrally buoyant particle rotates precisely like the surrounding fluid as it must since the fluid rotates as a rigid body. For an elongational flow the factor $11/70$ in Eq. (24b) is replaced by $8/42$. The conclusions for a nearly spherical particle in an elongational flow do not change.

[1] J. Einarsson, F. Candelier, F. Lundell, J. R. Angilella, and B. Mehlig, Phys. Fluids **27**, 063301 (2015).
[2] J. Einarsson, F. Candelier, F. Lundell, J. R. Angilella, and B. Mehlig, Phys. Rev. E **91**, 041002(R) (2015).
[3] T. Rosen, J. Einarsson, A. Nordmark, C. Aidun, F. Lundell, and B. Mehlig, arXiv:1508.04976.

