Microhydrodynamics, Brownian Motion, and Complex Fluids

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Errata, First Printing

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- p. 3, bottom. In the definition of uniaxial extension, it is more consistent with Figure 1.2 to set $\lambda_1 = \lambda_2 = -\dot{\epsilon}/2, \lambda_3 = \dot{\epsilon}$.

- pp. 6-8: the notation used in Section 1.1.2 is adequate for linear flows, but not more generally. Accordingly, the third sentence of this section should read

  > Consider a set of basis vectors $\boldsymbol{g}_i(\boldsymbol{\chi}, t)$ that are attached to the material point $\boldsymbol{X}(t, \boldsymbol{\chi})$ whose position at $t = 0$ is $\boldsymbol{\chi}$ (i.e. $\boldsymbol{X}(0, \boldsymbol{\chi}) = \boldsymbol{\chi}$).

  In the following sentence, "$\boldsymbol{g}_i(\boldsymbol{X}(0), 0) = \boldsymbol{e}_i$" should be replaced by "$\boldsymbol{g}_i(\boldsymbol{\chi}, 0) = \boldsymbol{e}_i$". In the last full sentence of p. 6, $\boldsymbol{X}$ should be replaced by $\boldsymbol{\chi}$. The first sentence of the first full paragraph of p. 7 should read

  > Because the $\boldsymbol{g}_i$ evolve as material lines, Equation (1.9) also holds with $\boldsymbol{g}_i$ replaced by an arbitrary infinitesimal material line $\Delta\boldsymbol{X}(t, \boldsymbol{\chi})$ attached to point $\boldsymbol{X}(t, \boldsymbol{\chi})\ldots$

  Finally, throughout this section, and also in problem 1.2, $\boldsymbol{X}(t)$ should be replaced by $\boldsymbol{X}(t, \boldsymbol{\chi})$, $\boldsymbol{X}(0)$ by $\boldsymbol{X}(0, \boldsymbol{\chi})$, and $\Delta\boldsymbol{X}(0)$ by $\Delta\boldsymbol{X}(0, \boldsymbol{\chi})$. Note that $\boldsymbol{X}(0, \boldsymbol{\chi}) = \boldsymbol{\chi}$. Thanks to Ehud Yariv for pointing out this notational problem.

- p. 8, Eq. (1.16): the index of the second sum should be j. Thanks to Zonghao Zou of UW-Madison for pointing this out.

- p. 14, Eq. (1.43) should read

$$p|_1 - \boldsymbol{n}_I \cdot \boldsymbol{\tau}|_1 \cdot \boldsymbol{n}_I = p|_2.$$

  Thanks to Ehud Yariv for pointing this out.

- p. 18, below the heading "*Locomotion of Linked Rigid Bodies*", the first two sentences should read:

  > Consider the two rods connected by a hinge shown in Figure 1.9(a). The hinge is "motorized" so that it moves the rods relative to one another in a cyclic manner as shown in the figure.

- p. 52, in the equation at the bottom of the page, the factor 4π in front of the integral should be $2\pi\,|\boldsymbol{f}\,|$.

- p. 54, Problem 2.5: The fourth sentence should read:

  > Let the particles each have a friction coefficient $\zeta = 6\pi\eta a$, use the regularized Green's function given by (2.72), and set $\kappa^{-1} = 3a/\sqrt{\pi}$."

- p. 60, the text below Eq. (3.30) should be modified to read "The constancy of the velocity and the dynamic part of the traction . . . "
- p. 67, at the end of Eq. (3.60), the large closing parenthesis should be to the right of the symbol dS.
- p. 69, in Eq. (3.67), a_1 and a_2 should be replaced by a_β and a_α, respectively.
- p. 73, second displayed equation, F_x should be F_z.
- p. 74, in Eq. (3.87), ζ_{E} should be replaced by $\zeta_{\mathrm{E}}/2$. Thanks to Ehud Yariv for pointing this out.
- p. 87, Problem 3.2: the no-penetration boundary condition $\boldsymbol{n} \cdot \boldsymbol{v} = 0$ should be replaced by $\boldsymbol{n} \cdot (\boldsymbol{v} - \boldsymbol{U}) = 0$. Thanks to Yijiang Yu and Kevin Zeng of UW-Madison for pointing this out.
- p. 88, Problem 3.5: in the equation for the velocity, $T_{\mathrm{drag},l}$ should be $T_{\mathrm{drag},j}$. Thanks to Yijiang Yu and Kevin Zeng of UW-Madison for pointing this out.
- p. 74: in Eqs. (3.83) and (3.84), the term $\mathbf{R}^{\mathrm{TE}} \cdot \mathbf{E}_\infty$ should be replaced by $\mathbf{R}^{\mathrm{TE}} : \mathbf{E}_\infty$.
- p. 89, Problem 3.11: this problem can't be solved with the information given on lubrication theory in the text.
- p. 131, the equation following (6.81) should not contain a dot product symbol.
- p. 180, fifth line of text from the bottom, the expression "$\langle B^{mn}_{\alpha\beta} B^{mp}_{\gamma\delta} \rangle = 2k_B T \mathrm{Tr}\mathbf{M}_{\alpha\gamma}$" should read "$\langle B^{mn}_{\alpha\beta} B^{mp}_{\gamma\delta} \rangle \delta_{\beta\delta}\delta_{np} = 2k_B T \langle \mathrm{Tr}\mathbf{M}_{\alpha\gamma} \rangle$"
- p. 217, second line: the expression for t_y should read "$t_y = \hat{\boldsymbol{n}} \cdot \boldsymbol{\sigma} \cdot \boldsymbol{e}_y = -\sigma_{yy}$".