Errata of Soft Matter Physics

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page 26, eq.(2.79)

$$\mu_i = \mu_i^0(T) + Pv_i + k_BT\ln\phi_i + \sum_{j=1}^{n}(2v_iA_{ij} - k_BT)\phi_j$$

→

$$\mu_i = \mu_i^0(T) + Pv_i + k_BT\ln\phi_i + \sum_{j=1}^{n}(2v_iA_{ij} - \underline{\frac{v_i}{v_j}}k_BT)\phi_j$$

page 26, problem (2.6)
eq.(2.63) → eq.(2.62)

page 27, eq.(2.82)

$$f(\phi) = \frac{k_BT}{v_c}\left[\sum_{i=1,2}\frac{1}{N_i}\phi_i\ln\phi_i - \chi(\sum_{i=1,2}\phi_i)^2\right]$$

→

$$f(\phi) = \frac{k_BT}{v_c}\left[\underline{(1-\phi)\ln(1-\phi)} + \sum_{i=1,2}\frac{1}{N_i}\phi_i\ln\phi_i - \chi(\sum_{i=1,2}\phi_i)^2\right]$$

page 34
The paragraph after eq.(3.15) must be corrected. The text says "any tensor $\boldsymbol{E}$ can be written as $\boldsymbol{E} = \boldsymbol{Q}\cdot\boldsymbol{L}$, where $\boldsymbol{L}$ is a diagonal tensor, and $\boldsymbol{Q}$ is an orthogonal tensor." This statement is not correct. The correct statement is: "any tensor $\boldsymbol{E}$ can be written as $\boldsymbol{E} = \boldsymbol{Q}\cdot\boldsymbol{S}$, where $\boldsymbol{S}$ is a symmetric tensor, and $\boldsymbol{Q}$ is an orthogonal tensor." This correction is needed since from eq.(3.17) one cannot conclude that $\boldsymbol{E}$ is written as $\boldsymbol{Q}\cdot\boldsymbol{L}$. In fact, eq.(3.17) is satisfied by $\boldsymbol{Q}\cdot\boldsymbol{q}\cdot\boldsymbol{L}\cdot\boldsymbol{q}^t\cdot$ for any orthogonal tensor $\boldsymbol{q}$.

Despite the correction, the subsequent statement "any uniform deformation is equivalent to a combination of orthogonal stretching (represented by $\boldsymbol{L}$) and rotation" is correct (although the rotation here must be understood to be described by $\boldsymbol{Q}$ and $\boldsymbol{q}$).
The author thanks Dr. Konstantin Volokh for pointing out this error.

page 49, problem (3.4)
$\lambda_1 = 1 \to \lambda_3 = 1$

page 50, problem (3.7)
Add the following sentence at the end of the problem.
"Assume that the polymer in the solution cannot get into the gel."

page 92, eq.(5.71)

$$F[\psi] = N\left[k_BT\int d\boldsymbol{u}\ \psi(\boldsymbol{u})\ln\psi(\boldsymbol{u}) + \frac{U}{2}\int d\boldsymbol{u}\int d\boldsymbol{u}'\ (\boldsymbol{u}\cdot\boldsymbol{u}')\psi(\boldsymbol{u})\psi(\boldsymbol{u}')\right]$$

→

$$F[\psi] = N\left[k_BT\int d\boldsymbol{u}\ \psi(\boldsymbol{u})\ln\psi(\boldsymbol{u})\underline{-}\frac{U}{2}\int d\boldsymbol{u}\int d\boldsymbol{u}'\ (\boldsymbol{u}\cdot\boldsymbol{u}')\psi(\boldsymbol{u})\psi(\boldsymbol{u}')\right]$$

page 92, eq.(5.74)

$$\frac{k_B T}{U} x = \coth x$$

$\rightarrow$

$$\frac{k_B T}{U} x = \coth x - \frac{1}{x}$$

page 111, eq.(6.85)

$$\zeta_{\alpha\beta} \frac{dx_\beta}{dt} + F_{r\alpha} = 0$$

$\rightarrow$

$$\underline{-}\zeta_{\alpha\beta} \frac{dx_\beta}{dt} + F_{r\alpha} = 0$$

page 113, eq.(6.105)

$$G(n, m, t) = \frac{1}{\sqrt{2\pi\lambda t}} \exp\left[-\frac{(n-m)^2}{2\lambda t}\right]$$

$\rightarrow$

$$G(n, m, t) = \frac{1}{\sqrt{\underline{4}\pi\lambda t}} \exp\left[-\frac{(n-m)^2}{\underline{4}\lambda t}\right]$$

page 132, eq.(7.105)

$$\frac{\partial \psi}{\partial t} = D_r \mathcal{R} \cdot \left(\mathcal{R}\psi + \frac{\mu_m \boldsymbol{u} \times \boldsymbol{H}}{k_B T} \psi \right)$$

$\rightarrow$

$$\frac{\partial \psi}{\partial t} = D_r \mathcal{R} \cdot \left(\mathcal{R}\psi \underline{-} \frac{\mu_m \boldsymbol{u} \times \boldsymbol{H}}{k_B T} \psi \right)$$

page 135, eq.(7.126)

$$\Phi = \frac{\eta}{4} h \int_0^a dr\ 2\pi r \left(\frac{dv}{dr} \right)^2$$

$\rightarrow$

$$\Phi = \frac{\eta}{\underline{2}} h \int_0^a dr\ 2\pi r \left(\frac{dv}{dr} \right)^2$$

page 135, problem (7.1) (b)

$\Phi = (\pi/2)\eta h \dot{h}^2 \rightarrow \Phi = 4\pi\eta h \dot{h}^2$

page 136, eq.(7.132)

$$\mu(x, x') = -\frac{\partial}{\partial x} \left[\frac{n(x)}{\zeta} \frac{\partial}{\partial x'} \delta(x - x') \right]$$

$\rightarrow$

$$\mu(x, x') = -\frac{\partial}{\partial x} \left[\frac{n(x)}{\zeta} \frac{\partial}{\partial \underline{x}} \delta(x - x') \right]$$

page 162, three lines below eq.(8.126)

by eq.(8.20) $\rightarrow$ *by eq.(8.20) except for numerical factor* $\sqrt{3}$

page 163, eq.(8.137)

$$\chi(\boldsymbol{r},\boldsymbol{r'},t) = \frac{\bar{n}}{k_BT}\left[g_{md}(\boldsymbol{r}-\boldsymbol{r'},0) - g_{md}(\boldsymbol{r}-\boldsymbol{r'},t)\right]$$

$\rightarrow$

$$\chi(\boldsymbol{r},\boldsymbol{r'},t) = \frac{\bar{n}}{k_BT}\left[\underline{g_d}(\boldsymbol{r}-\boldsymbol{r'},0) - \underline{g_d}(\boldsymbol{r}-\boldsymbol{r'},t)\right]$$

page 164, eq.(8.141)

$$\frac{\partial\delta\phi}{\partial t} = \frac{\phi_c}{\xi}\nabla^2\left[a(T-T_c)\delta\phi + \phi_c\kappa_s\nabla^2\delta\phi - h(\boldsymbol{r})\right]$$

$\rightarrow$

$$\frac{\partial\delta\phi}{\partial t} = \frac{\underline{\underline{\phi_c^2}}}{\xi}\nabla^2\left[a(T-T_c)\delta\phi\underline{-}\kappa_s\nabla^2\delta\phi - h(\boldsymbol{r})\right]$$

page 164, eq.(8.142)

$$S_d(\boldsymbol{k},t) = \frac{k_BT}{a(T-T_c) + \underline{\phi_c}\kappa_s\boldsymbol{k}^2}\exp[-\alpha_{\boldsymbol{k}}t]$$

$\rightarrow$

$$S_d(\boldsymbol{k},t) = \frac{k_BT}{a(T-T_c) + \kappa_s\boldsymbol{k}^2}\exp[-\alpha_{\boldsymbol{k}}t]$$

page 164, eq.(8.143)

$$\alpha_{\boldsymbol{k}} = \frac{\phi_c\boldsymbol{k}^2}{\xi}\left[a(T-T_c) + \underline{\phi_c}\kappa_s\boldsymbol{k}^2\right]$$

$\rightarrow$

$$\alpha_{\boldsymbol{k}} = \frac{\underline{\underline{\phi_c^2}}\boldsymbol{k}^2}{\xi}\left[a(T-T_c) + \kappa_s\boldsymbol{k}^2\right]$$

page 164, eq.(8.145)

$$A = \int_0^h dx\frac{K_e}{2}\left(\frac{\partial u}{\partial x}\right)^2 - [u(h)-u(0)]w$$

$\rightarrow$

$$A = \int_0^h dx\frac{K_e}{2}\left(\frac{\partial u}{\partial x}\right)^2 \underline{+}[u(h)-u(0)]w$$

page 164, eq.(8.146)

$$\Phi = \frac{1}{2}\int_0^h dx\frac{\dot{u}^2}{\underline{2}\kappa}$$

$\rightarrow$

$$\Phi = \frac{1}{2}\int_0^h dx\frac{\dot{u}^2}{\kappa}$$

page 196, problem (9.7)

$d = 1nm\ in\ water \rightarrow d = 5nm\ in\ water$

page 199, 3 lines below eq.(10.8)

Delete the following last sentence of the paragraph "The pK of acid is less than 7 and the pK of base is larger than 7."

This is completely my mistake. I may add the following in the text.
The dissociation of base BOH

$$\mathrm{BOH} \leftrightarrow \mathrm{B}^+ + \mathrm{OH}^- \tag{1}$$

is described by

$$\log_{10}\frac{1-\alpha}{\alpha} = \mathrm{pK_{BOH}} - \mathrm{pOH} = \mathrm{pK_{BOH}} - 14 + \mathrm{pH} \tag{2}$$

page 221, problem (10.1)

pK=9.3 for NH_4OH $\rightarrow$ *pK=4.7 for* NH_4OH

page 221, problem (10.4)

by eq.(10.30) $\rightarrow$ *by eq.(10.27)*

page 235, line 2

(see eq.(5.11)) $\rightarrow$ *(see eqs.(5.11) and (5.23))*

page 246, Fig.E.1

The label of the y-axis: $\langle F_j(t)\rangle_{x+\delta x} \rightarrow \langle F_{\underline{i}}(t)\rangle_{x+\delta x}$