

CORRIGENDA
Polymer Processing - Modeling and Simulation
Version 5.0 April 27, 2010

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Page	Location	Reads	Should Read
xxiii	Eqn. (1.7)	$\mu \frac{u_0^i}{h_i}$	$\mu \frac{u_0^i}{h_i} A_i$
xxiii	Eqn. (1.11)	$n_2 = n_2/\mathcal{R}$	$n_2 = n_1/\mathcal{R}$
2	4th line 2nd paragraph	...as well as bor or beryllium (B)	...as well as boron (B) or beryllium (Be)
2	5th line 2nd paragraph	can sometime be...	can sometimes be...
4	Last line 2nd paragraph	polycondensation	polycondensation
13	Table 1.2	Flourine	Fluorine
13	Table 1.2	Zink	Zinc
16	Table 1.3	teraphthalate	terephthalate
19	Legend Fig. 1.22	tempreature	temperature
24	2nd line 1st paragraph	differently than...	different than...
27	After Eqn. (1.10)	include “for temperatures between the glass-transition temperature T_g and $T_g + 100\text{K}$,”	
27	2nd line after Eqn. (1.10)	$C_2 = 51.6$	$C_2 = 51.6\text{K}$
27	Last line	The relaxation time for...	The longest relaxation time for...
29	1st line	The relaxation time for...	The longest relaxation time for...
30	Last line in PMMA	jewlery	jewelry
33	NBR Section, 4th Bullet	ACM	ACN
63	Eqn. (2.41)	$(1 - c)^2$	$(1 - c)^n$
66	Eqn. (2.51)	$N_1 = \tau_{xx} - \tau_{yy} = -\Psi_1 \dot{\gamma}_{xy}^2$	$N_1 = \tau_{xx} - \tau_{yy} = +\Psi_1 \dot{\gamma}_{xy}^2$
66	Eqn. (2.52)	$N_2 = \tau_{yy} - \tau_{zz} = -\Psi_2 \dot{\gamma}_{xy}^2$	$N_2 = \tau_{yy} - \tau_{zz} = +\Psi_2 \dot{\gamma}_{xy}^2$
70	Eqn. (2.58)	$\frac{\eta - \eta_0}{\eta_0 - \eta_\infty} = \dots$	$\frac{\eta - \eta_\infty}{\eta_0 - \eta_\infty} = \dots$

Page	Location	Reads	Should Read
80	Before Eqn. (2.89)	Plannar elongational	Planar elongational
80	Eqn. (2.91) should be	$\bar{\eta}_1 = \frac{\tau_{zz} - \tau_{xx}}{\dot{\epsilon}_0} = \frac{(3+b)\eta(\dot{\gamma})}{[1 + (1+b)(\eta/G)\dot{\epsilon}_0][1 - 2(\eta/G)\dot{\epsilon}_0]}$ $\bar{\eta}_2 = \frac{\tau_{yy} - \tau_{xx}}{\dot{\epsilon}_0} = \frac{2b\eta(\dot{\gamma})}{[1 + (1+b)(\eta/G)\dot{\epsilon}_0][1 + (1-b)(\eta/G)\dot{\epsilon}_0]}$	
80	Eqn. (2.62)	τ_y (3 times)	τ_Y
94	First bullet list	<i>Diffusion</i> diffusion	<i>Diffusion</i>
100	Caption Fig. 2.61	Glassy Polymers (<i>circ</i>)	Glassy Polymers (\circ)
102	Last line paragraph after Eqn. (2.120)	whereas	whereas
107	Problem 2.10	this resultls	this results
107	Problem 2.10	this fuctions	this functions
108	Problem 2.13	develop in	developed in
111	Last line first bullet	compression	compression
126	Table 3.2, 1st section	Natural	Natural
137	Legend Fig. 3.34	cokneater	cokneader
151	Legends Fig. 3.52	Spinnerette	Spinneret
152	Last two lines	Missing sub-title from: "The predecessor... "	Blow Molding
163	2nd Line, 2nd Paragraph	thermoset materials	thermoset material
163	Last Line, 3rd Paragraph	Here, one	With LFT, one
165	3rd Paragraph, Line 8	whithin	within
165	3rd Paragraph, Line 9	matress	mattress
165	3rd Paragraph, Line 15	foam is is	foam is
166	1st Line	are primarely	are primarily
172	Line after Eqn. (4.1)	...in an $MLT\Theta$ system and in an $FLT\Theta$ system, respectively.	...in an $MLT\Theta$ system.
172	Last Paragraph	choose $D, \mu,$	choose D, η

Page	Location	Reads	Should Read
175	Title Table 4.2	Base and Secondary Quantities for	Dimensionless Numbers for
175	Definition flow number	$\frac{\dot{\gamma}}{\dot{\gamma} - \omega}$	$\frac{\dot{\gamma}}{\dot{\gamma} + \omega}$
175	Definition of Froude number	$\frac{u^2}{lq}$	$\frac{u^2}{lg}$
175	Definition of Galilei number	$\frac{gl^3}{\nu^2}$	$\frac{gl^3}{\nu^2}$
176	Title Table 4.3	Base and Secondary Quantities for	Dimensionless Numbers for
177	Title Table 4.4	Base and Secondary Quantities for	Dimensionless Numbers for
189	Legend Fig. 4.8	$\frac{pD}{\eta N L}$	$\frac{\Delta p D}{\eta_0 n L}$
189	Legend Fig. 4.8	$\frac{K}{\eta NLD}$	$\frac{F}{\eta_0 n LD}$
189	Text in Fig. 4.8	plate model with leakage	plate model without leakage
189-191	Legend in Figs. 4.8, 4.9 and 4.10 are inconsistent with the text: N instead of n , η instead of η_0		
192	1st Paragraph, 4th Line	screw characteristic for	screw characteristic curves for
195	Eqn. (4.47)	$\dots \frac{\eta_0 \tau R}{\sigma_s}$	$\dots \frac{\eta_0 \dot{\gamma} R}{\sigma_s}$
197	Example 4.6, Process variables	inital degree of cure	initial degree of cure
203	Line after Eqn. (4.76)	As the velocity	For the velocity
203	Missing text before problems:	“...shows an even higher increase in pressure requirement due to the effects of pressure on viscosity. According to the model, for materials with a high pressure dependance on viscosity, the flow experiences a lock-up effect.”	
203	2nd Line, Problem 4.1	The the size	The size
203	3rd Line, Problem 4.1	density of the liquid.	density of the liquid, ρ .
205	5ft Line, Problem 4.7	Arquimedes	Archimedes
211	Legend Fig. 5.4	Differential fluid element traveling along its streamline x -direction forces that act on its surfaces.	Differential fluid element traveling along its streamline.

Page	Location	Reads	Should Read
214	Missing plus (+) sign between $\frac{1}{r} \frac{\partial}{\partial r}(r^2 \tau_{rr})$ and $\frac{1}{r} \frac{\partial}{\partial \theta}(\tau_{\theta r})$ in the r -momentum in Cylindrical coordinates		
214	Missing plus (+) sign between $\frac{1}{r} \frac{\partial}{\partial r}(r^2 \tau_{r\theta})$ and $\frac{1}{r} \frac{\partial}{\partial \theta}(\tau_{\theta\theta})$ in the θ -momentum in Cylindrical coordinates		
214	Missing plus (+) sign between $\frac{1}{r} \frac{\partial}{\partial r}(r^2 \tau_{rz})$ and $\frac{1}{r} \frac{\partial}{\partial \theta}(\tau_{\theta z})$ in the z -momentum in Cylindrical coordinates		
214	θ -momentum equation Spherical	$\dots - \frac{u_r u_\theta - u_\phi^2 \cot \theta}{r}$	$\dots + \frac{u_r u_\theta - u_\phi^2 \cot \theta}{r}$
216	z -Navier-Stokes in Cylindrical	$-\frac{\partial p}{\partial z} + \left[\frac{\partial}{\partial r} (\dots$	$-\frac{\partial p}{\partial z} + \mu \left[\frac{\partial}{\partial r} (\dots$
216	θ -Navier-Stokes Spherical	$\dots - \frac{u_r u_\theta - u_\phi^2 \cot \theta}{r}$	$\dots + \frac{u_r u_\theta - u_\phi^2 \cot \theta}{r}$
220	1st Line, 2nd Paragraph	oder	order
225	Paragraph after title 5.3, 4th Line	of the ,	of the Hele-Shaw model,
226	Eqn. (5.60)	\int_0^h	$\int_0^{h/2}$
235	Eqn. (5.105)	$\frac{\partial p}{\partial x}$	$\frac{\partial p}{\partial x} z$
248	Eqn. (6.5)	$(2hy - y^2)$	$(hy - y^2)$
257	There is a missing exponent 1/3 in the second line of Eqn. (6.25)		
262	There is a missing factor (Wh^3) inside the brackets of Eqn. (6.49)		
262	Denominator Eqn. (6.50)	$[(3 + 1/n/\pi)^n$	$[(3 + 1/n)\pi]^n$
262	Numerator Eqn. (6.50)	$2^n(2 + 1/n)^n(-\sin \alpha)$	$2^n(2 + 1/n)^n(\sin \alpha)$
276	Label Fig. 6.23	$\hat{Z} = 20$	$\hat{z} = 20$
277	Eqn. (6.122)	$\hat{Z} = Z/R_0$	$\hat{z} = z/R_0$
277	There is an extra parenthesis at the end of Eqn. (6.125)		
284	2nd line Example 6.6	$w = 100$ cm	$W = 100$ cm
285	1st line Example 6.6	$Q = 2Uh_1W = 8.72 \times 10^5$	$Q = 2Uh_1W = 1.744 \times 10^{-4}$
285	2nd line Example 6.6	specific heat of 1000 J/kg/K	specific heat of 1500 J/kg/K

Page	Location	Reads	Should Read
285	Eqn. (6.157)	Replace the correct value of $Q = 1.744 \times 10^{-4} \text{ m}^3/\text{s}$	
285	Eqn. (6.157)	$\Delta T = 7 \text{ K}$	$\Delta T = 3.5 \text{ K}$
286	Eqn. (6.166)	\hat{p}	\hat{p}_{max}
286	Eqn. (6.167)	Missing integration variable $d\xi$	
286	Eqn. (6.169)	$\sqrt{Rh_o}$	$\sqrt{R/h_o}$
287	Eqn. (6.171)	Missing integration variable $d\xi$	
291	Line after Eqn. (6.183)	independen	independent
300	Fist line after 6.6.3 heading	asses	assess
300	3rd line after Eqn. (6.217)	timebetween	time between
305	Example 6.8, equation for Sec. 3	$Q = \frac{\pi R_2^3}{s+3} \left[\frac{R_1(p_2 - 0)}{4mL} \right]^s$	$Q = \frac{\pi R_2^3}{s+3} \left[\frac{R_2(p_2 - 0)}{4mL} \right]^s$
306	Figure 6.54, section 1 radius	$2R_1$	$1.5R_1$
311	Legend Fig. 6.59	The values of Ω must be multiply by -1	
312	1st Line	$\tau_{yx} = \mu \left(\frac{\partial p}{\partial x} \right)$	$\tau_{yx} = \mu \left(\frac{\partial u_x}{\partial y} \right)$
312	Eqn. (6.257)	$\dots = \frac{\Delta P}{L} + C_1$	$\dots = \frac{\Delta P}{L} y + C_1$
322	Eqn. (6.297)	$\dot{\delta}$	δ
330	Eqns. (6.346), (6.347) and (6.348)	$ae^{E/RT}$	$a^{-1}e^{E/RT}$
331	Eqn. (6.349)	$\frac{T_g - T_{g0}}{T_{g0}} = \dots$	$\hat{T}_g - 1 = \frac{T_g - T_{g0}}{T_{g0}} = \dots$
331	Eqn. (6.352)	$-ae^{E/RT}$	$-a^{-1}e^{E/RT}$
337	Problem 6.24	bein	being
338	Problem 6.31	$\frac{dc}{dt} = ae^{-E/RT}(1 - c^2)$	$\frac{dc}{dt} = ae^{-E/RT}(1 - c)^2$
339	Problems 6.32 and 6.33	Missing information $E = 12.618 \text{ Cal/mol}$	
386	Fig. 8.1	Subindexes to the right of i and i, j must be $i + 1$	

Page	Location	Reads	Should Read
389	Columns 5 Table 8.1	$\dots\Delta x^n)$	$\dots\Delta x)^n$
389	Columns 6 Table 8.1	$\dots\Delta x^{n+1})$	$\dots\Delta x)^{n+1}$
391	Line after Eqn. (8.24)	\dots and $1/3\Delta x$	\dots and $d = 1/3\Delta x$
391	Eqn. (8.25)	$(\phi_{i-2} - \phi_{i-1} + 3\phi_i + 2\phi_{i+1})$	$(\phi_{i-2} - 6\phi_{i-1} + 3\phi_i + 2\phi_{i+1})$
392	Columns 4 Table 8.3	$\dots\Delta x)$	$\dots\Delta x)^2$
392	Columns 5 Table 8.3	$\dots\Delta x^3)$	$\dots\Delta x)^3$
392	Columns 6 Table 8.3	$\dots\Delta x^4)$	$\dots\Delta x)^4$
392	Columns 7 Table 8.3	$\dots\Delta x^5)$	$\dots\Delta x)^5$
396	Fig. 8.5, in the Fig.	T_b	T_0
459	Element force vectors	$\frac{c\ell_1}{2}, \frac{c\ell_2}{2}, \frac{c\ell_3}{2}$ and $\frac{c\ell_4}{2}$	$\frac{\dot{Q}\ell_1}{2}, \frac{\dot{Q}\ell_2}{2}, \frac{\dot{Q}\ell_3}{2}$ and $\frac{\dot{Q}\ell_4}{2}$
460	Paragraph after Eqn. (9.23)	A three-noded triangle will have 2 columns ...	A three-noded triangle will have 3 columns ...
460	Eqn. (9.24) should be	$[\mathbf{K}] = k \begin{bmatrix} 1/\ell_1 & -1/\ell_1 & 0 & 0 & 0 \\ -1/\ell_1 & 1/\ell_1 + 1/\ell_2 & 0 & 0 & -1/\ell_2 \\ 0 & 0 & 1/\ell_4 & -1/\ell_4 & 0 \\ 0 & 0 & -1/\ell_4 & 1/\ell_3 + 1/\ell_4 & -1/\ell_3 \\ 0 & -1/\ell_2 & 0 & -1/\ell_3 & 1/\ell_2 + 1/\ell_3 \end{bmatrix}$	
461	Eqn. (9.25)	$\begin{pmatrix} \frac{c\ell_1}{2} \\ \frac{c\ell_1}{2} + \frac{c\ell_2}{2} \\ \frac{c\ell_3}{2} \\ \frac{c\ell_3}{2} + \frac{c\ell_4}{2} \\ \frac{c\ell_2}{2} + \frac{c\ell_3}{2} \end{pmatrix}$	$\begin{pmatrix} \frac{\dot{Q}\ell_1}{2} \\ \frac{\dot{Q}\ell_1}{2} + \frac{\dot{Q}\ell_2}{2} \\ \frac{\dot{Q}\ell_4}{2} \\ \frac{\dot{Q}\ell_3}{2} + \frac{\dot{Q}\ell_4}{2} \\ \frac{\dot{Q}\ell_2}{2} + \frac{\dot{Q}\ell_3}{2} \end{pmatrix}$
467	Eqn. (9.44)	$= 0$	$= \int_{x_1}^{x_2} \dot{Q}N_i dx$
472	Eqn. (9.57) should be	$[\mathbf{X}]^{-1} = \frac{1}{ \mathbf{X} } \begin{bmatrix} x_2y_3 - x_3y_2 & x_3y_1 - x_1y_3 & x_1y_2 - x_2y_1 \\ y_2 - y_3 & y_3 - y_1 & y_1 - y_2 \\ x_3 - x_2 & x_1 - x_3 & x_2 - x_1 \end{bmatrix}$	
473	Before Eqn. (9.66)	\dots which results i	which results in
473	Eqn. (9.66)	$\int_V f N_i dV$	$-\int_V f N_i dV$
473	Eqn. (9.68)	$\frac{1}{\text{Area}^e}$	$\frac{1}{2\text{Area}^e}$

Page	Location	Reads	Should Read
474	Eqn. (9.69)	$\alpha \frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2}$	$\alpha \left(\frac{\partial^2 T}{\partial x^2} + \frac{\partial^2 T}{\partial y^2} \right)$
480	Jacobian Calculation	$\text{jac}(1,k2) = \text{jac}(1,k2) + \dots$ $\text{jac}(2,k2) = \text{jac}(2,k2) + \dots$	$\text{jac}(1,k1) = \text{jac}(1,k1) + \dots$ $\text{jac}(2,k1) = \text{jac}(2,k1) + \dots$
491	Eqn. (9.135)	$u_x = \dots$	$u_x^e = \dots$
492	Eqn. (9.140)	S_{pij}^{11}	S_{pij}^{14}
492	Eqn. (9.140)	S_{pij}^{12}	S_{pij}^{24}
492	Eqn. (9.140)	S_{pij}^{13}	S_{pij}^{34}
517	Table 10.1: 2D Laplace	$\phi^* = \frac{-1}{2\pi r} \ln r$	$\phi^* = \frac{-1}{2\pi} \ln r$
517	Table 10.1: 3D Bi-harmonic	$\phi^* = \frac{-r}{8\pi r}$	$\phi^* = \frac{-r}{8\pi}$
523	Eqn. (10.38)	$\begin{pmatrix} u_1 \\ u_2 \\ \dots \\ u_N \end{pmatrix}$	$\begin{pmatrix} T_1 \\ T_2 \\ \dots \\ T_N \end{pmatrix}$
569	1st Paragraph after Eqn. (11.4)	Equation (11.47)	Equation (11.4)
569	2nd Paragraph after Eqn. (11.4)	eqn. (11.47)	eqn. (11.4)
572	Eqn. (11.28), 1st term righthand side	Δ	Δp
577	3rd line Eqn. (11.35)	$\sum_{j=1}^N \left[-\frac{\partial \phi_u(r_{ij})}{\partial r} \frac{\partial \eta_i}{\partial y} \frac{\partial r_{ij}}{\partial y} \right] \xi_j + \dots$	$\sum_{j=1}^N \left[-\frac{\partial \phi_u(r_{ij})}{\partial r} \frac{\partial \eta_i}{\partial y} \frac{\partial r_{ij}}{\partial x} \right] \xi_j + \dots$
577	3rd line Eqn. (11.37)	$\sum_{j=1}^N \left[-\frac{\partial \phi_u(r_{ij})}{\partial r} \frac{\partial \eta_i}{\partial x} \frac{\partial r_{ij}}{\partial x} \right] \lambda_j + \dots$	$\sum_{j=1}^N \left[-\frac{\partial \phi_u(r_{ij})}{\partial r} \frac{\partial \eta_i}{\partial x} \frac{\partial r_{ij}}{\partial y} \right] \lambda_j + \dots$
580	Eqn. (11.58)	$\eta(\dot{\gamma}, T) = \frac{K_1}{(1 - K_2 \dot{\gamma})^{K_3}}$	$\eta(\dot{\gamma}, T) = \frac{K_1}{(1 + K_2 \dot{\gamma})^{K_3}}$

Page	Location	Reads	Should Read
584	k value Table 11.1	10.0 W/m/K	0.28 W/m/K
584	T_0 value Table 11.2	200°C	220°C
584	Eqn. (11.59)	$\eta(\dot{\gamma}, T) = \frac{K_1}{(1 - K_2\dot{\gamma})^{K_3}}$	$\eta(\dot{\gamma}, T) = \frac{K_1}{(1 + K_2\dot{\gamma})^{K_3}}$
590	Pressure axis Fig. 11.21	from 0 to 160 MPa	from 0 to 16 MPa
594	Problem 11.2 should read:	<p>The International Association for the Engineering Analysis Community (NAFEMS) defines a test for the evaluation of the diffusive term of the energy equation using Dirichlet, Neumann and Robin boundary conditions.</p> <p>In this test, the domain defined in the Fig. 11.30 has as boundary conditions,</p> <p>$T = T_a$ in \overline{CD}, $-k \frac{\partial T}{\partial x} = 0$ in \overline{AD}, $-k \frac{\partial T}{\partial x} = h(T - T_\infty)$ in \overline{BC} and $-k \frac{\partial T}{\partial y} = h(T - T_\infty)$ in \overline{AB}, where...</p>	