

Errata
for

Nuclear Reactor Analysis

A. F. Henry
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<http://www.corephysics.com/>

- Page 32 line 11 from bottom; full \rightarrow fuel
- 79 Eq. (3.3.28): add ν
- 92 space \rightarrow spaced: Heading, 3rd paragraph
- 105 $n^j(\underline{r}, E) \rightarrow n^j(\underline{r})$
- 103 (3.3.27) \rightarrow (3,3.21); (line 1 and line 4)
- ✓133 extra bracket] in Eq. (4.7.13)
- ✓145 "mean paths" \rightarrow mean free paths; line 2 from bottom
- 315 ✓ it it \rightarrow it is; line 12 from top
- 364 ✓ $\Sigma'_s(E' \rightarrow E, \mu) \rightarrow \Sigma_s(E' \rightarrow E, \mu_0)$; line 3 from top
- 470 ✓ eq. (11.2.26); $k \rightarrow K$

p. 137 cylindrical equation
 $\frac{\pi}{L_z} \rightarrow \frac{\pi z}{L_z}$

p. 30
 4.30 $R(r)$ should be outside bracket

Errata - Nuclear Reactor Analysis, by Allan F. Henry

- page 3 Last word: atomic mass
- page 5 3rd paragraph; line 8: two billion → six billion
- page 7 5th line: α particle — occasionally an electron → α particle, or an electron
- page 8 The paragraph beginning "Now, even in..." change both 10^{-12} 's to 10^{-13} 's.
- page 8 The paragraph beginning "If we were..."; change ellipse to ellipsoid,
- page 9 Paragraph beginning "Neutrons ..." 9th line: \$14 → \$35
11th line: an electron → two electrons
- page 11 First sentence after Eq(1.4.1) "The curve (1.4.1) etc." "An approximation to the curve (1.4.1) etc."
- page 27 8 lines from bottom ~ 100Kev → ~ 100 ev.
- page 30 1st line: the the → the
- page 37 References: Physics of Nuclear Kinetics is by G.R. Keepin (not Keeping).
- page 41 Paragraph beginning "Finally ..." 3rd line: remove words "of direction"
- Page 44 Eq(2.3.6), denominator: $N(\underline{r}, \underline{\Omega}, E) |_{\alpha=0}$ $N(\underline{r}, \underline{\Omega}, E) |_{x=0}$
- Page 47 Equation (2.4.6): The integral should contain $d\varphi(\sin\theta)/4\pi$
- page 48 Equa. 2.4.10 $\sigma_1^j(E \rightarrow E'), \underline{\Omega} \cdot \underline{\Omega}' \rightarrow \sigma_1^j(E \rightarrow E', \underline{\Omega} \cdot \underline{\Omega}')$

Page 51 The paragraph, in the middle of the page, beginning "Since E , E^1 , and μ_0 are all measured" is incorrect. Disregard it.

Also, the paragraph immediately following the above is arranged improperly. It should read:

"Rate at which neutrons in dV are scattered elastically from the beam $d\Omega dE$ into the conical shell $d\mu_0/2$

$$= \sum_j \sum_s^j(E) f_s^j(E, \mu_0) \frac{d\mu_0}{2} \sigma(E) N(\vec{r}, \vec{\Omega}, E) dV d\Omega dE$$

and the rate at which neutrons are scattered elastically from the beam $d\Omega dE$ into the energy range dE'

$$= \sum_j \sum_s^j(E) f_s^j(E \rightarrow E') dE' \sigma(E) N(\vec{r}, \vec{\Omega}, E) dV d\Omega dE."$$

Page 54 Paragraph after Eq(2.5.8), third line: $\cos \phi \rightarrow \cos \theta$

page 55 1st paragraph: Equation 2.5.4 \rightarrow Equation 2.5.14

Page 56 Delete 1st 3 lines beginning "It should also be noted ..."

page 61 2 lines above (2.6.1): At point $\underline{r} \rightarrow$ containing point \underline{r}

page 62 Equa. 2.6.5: $f_s^j(E, \mu_0)] \rightarrow f_s^j(E, \mu_0)$

Page 64 Problem 2: N is known to be 10^4 neutrons per cm^3 ...

Page 65 Problem 6: The first equation should contain μ_c instead of μ

Page 65 Problem 14 b & c: neutrons/ cm^2 ... (not neutrons/cc ...)

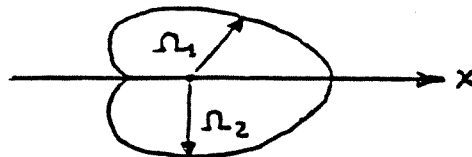
Page 66 The word "is" is missing from a sentence in the last paragraph. "The reason for this is that, ..."

Page 73 Statement 2: "All the elements...real and positive." "All the elements...real and have the same sign."

Page 83 Top of page: "... the function has a small value (≈ 1.75 MeV). Similarly, the unit "MeV" is missing on the value 0.5 at the end of the first paragraph.

Page 87 Top of page: the division $6.67/6.697$ yields 0.996. Hence only about 0.4 percent of the neutrons Similarly, the value on the fourth line is 0.4%, and not 4%.

- Page 88 Equation (3.4.20): The second integral should contain α_k in the denominator (not α_j).
- Page 91 The word "arbitrary" at the end of the first paragraph has been misspelled.
- Page 103 First line: (3.3.27) \rightarrow (3.3.21)
- Page 108 The integral at the top of the page is missing a "v" between dE and Σ_f
- Page 110 The integral in the denominator of Eq (3.5.12) should be \int_{fuel} (not \int_{cell}). The argument is also slightly wrong here.
- Page 118 Line above Eq. (4.2.7): $\underline{J}(\underline{r}, E) \cdot \underline{i} \rightarrow \underline{J}(\underline{r}, E) \cdot \underline{i} dE$
- Page 122 Last paragraph should read "if $N(\underline{r}, \underline{\Omega}, E)$ is not to" and not "otherwise $N(\underline{r}, \underline{\Omega}, E)$ will " and " $V_z(\underline{r}, E)$ should never," and not "can" never.
- Page 122 Fig. (4.4b): drawing should look like this:



- Page 127 4th and 3rd lines from bottom should read "...for five or more arbitrary directions of reentry generally yields..."
- Page 132 The gradient of Eq. (4.7.7) has been improperly taken--terms and constants are missing (very top of page).
- Page 133 2.2 (3.2.4) \rightarrow (3.2.5)
- Page 133 Omit the small bracket in Eq. (4.7.13) between the large bracket and ψ_g ,
- Page 137 Table 4.1: The bottom term under $R(\underline{r})$ should contain the factor $\sin(\frac{\pi z}{L})$ (the "z" is missing).
- Page 138 Second line of 2nd paragraph should read: "by (4.7.20) is less than about 5 percent, and therefore the accuracy ..."
- Page 148 11th line should begin " $\nabla(\underline{r}, E)$ and $\underline{n} \cdot D \nabla \phi(\underline{r}, E)$ be ..." (add capital "D").
- page 154 The line after Eq. (4.10.22) should end " $C_5 \sinh C_6 \equiv + C_4$ and $C_5 \cosh C_6 \equiv - C_3$
- Page 156 Equation (4.10.30) should read, $\frac{1}{\lambda} \nu \Sigma_f^k X(x)$. (add ν)

Page 160 Equation (4.10.51) should read:

$$\bar{P} = \frac{1}{(3 \times 10^{10}) \pi R_1^2 L_2} \int_0^\infty dE \int_0^{R_1} (2\pi r) dr \int_0^{L_2} dz \sum_f (r, z, E) \Phi(r, z, E)$$

$$= \frac{(2\pi)}{(3 \times 10^{10}) \pi R_1^2 L_2} \int_0^{L_2} dz \left[\int_0^{R_1} (r) \sum_f^{(1)} \Phi(r, z) dr + \int_{R_1}^{R_2} (r) \sum_f^{(2)} \Phi(r, z) dr \right]$$

(corrections circled).

Page 164 Change definitions of v_1 and v_2 to

$$\frac{1}{v_1} = \frac{\int_{E_c}^\infty \frac{\phi_1(r, E)}{v(E)} dE}{\int_{E_c}^\infty \phi(r, E) dE} \quad ; \quad \frac{1}{v_2} = \frac{\int_0^{E_c} \frac{\phi_2(r, E)}{v(E)} dE}{\int_0^{E_c} \phi_2(r, E) dE}$$

✓ Page 164 Also Eq. 4.11.4, last line: $v \Sigma_f(E') \rightarrow v \Sigma_f^k(E')$

✓ Page 165 Eq. 4.11.6, 1st line: $D(E) \rightarrow D^k(E)$

✓ Page 167 Eq. (4.11.11) last line \rightarrow

$$\int_{x_{i-\frac{1}{2}}}^{x_{i+\frac{1}{2}}} dx \int_{y_{j-\frac{1}{2}}}^{y_{j+\frac{1}{2}}} dy \text{ [etc]}$$

✓ Page 170 line after Eq 4.11.15: $z = Z_1 \rightarrow z = \pm Z_1$

✓ Page 170 Eq 4.11.17, 2nd line: $X_1 \rightarrow X_1(x)$

✓ Page 174 5th line of text: $C_2 \rightarrow C_2^{(1)}$

✓ Page 177 7th line from bottom: $P_{L_1}^f \rightarrow P_{L_2}^f$

✓ Page 178 Eq 4.12.16, multiply by $\Sigma_{a_2}^{\text{fuel}}$

✓ Page 178 line after Eq 4.12.18: $L_2^2 \rightarrow L_2$

✓ Page 180 Eq 4.12.27: the (2.3) element $s_2 D_1^{(2)} \kappa_2 X_2 \rightarrow s_2 D_1^{(2)} \kappa_2$

✓ Page 181 2nd line: impossible \rightarrow unlikely

✓ Page 182 3rd paragraph, line 6: (4.7.23) \rightarrow (4.7.22)

✓ Page 190 Eq 4.13.2: $\psi^k(E) \rightarrow \psi_g^k(E)$ and line 4: $E_2 - E_1 \rightarrow E_1 - E_2$

✓ Page 191 Eq 4.13.5, 2d line: $\psi_g^k(\underline{r}, E') \rightarrow \psi_{g'}^k(E')$

✓ Page 191 Eq 4.13.6, last line: $\int_{\Delta E_{g'}} dE \rightarrow \int_{\Delta E_g} dE$

✓ Page 191 Eq 4.13.7: $\chi_{fg}^{jvj\Sigma^{jkk}}(\underline{r}) \rightarrow \chi_{fg'}^{jvj\Sigma^{jkk}}(\underline{r})$

✓ Page 196 Problem 16: replace $\sigma_s = 8b$, $\sigma_f = 4b$, $\sigma_a = 3.85b$ by
by $\sigma_s = 4b$, $\sigma_f = 1.2b$, $\sigma_a = 0.5b$

✓ Page 202 Eq 5.2.3: $\approx \rightarrow \sim$; $k = 8.6 \times 10^{-5} \text{ ev}/^\circ\text{K}$

✓ page 203 Equa. 5.2.5: $\sigma_a(E, T) \rightarrow \sigma_c(E, T)$
 $\left[\frac{E_0}{E} \dots \right] \rightarrow \left[\frac{1}{E} \dots \right]$; $\int_0^\infty dE_r \frac{\Gamma^2(\dots)}{\dots}$
 $\rightarrow \int_0^\infty dE_r \frac{\sqrt{E_r} \Gamma^2(\dots)}{\dots}$

✓ Page 205 Eq 5.2.13: $\exp\left(\frac{1}{4}\xi^2(x-y)^2\right) \rightarrow \exp\left(-\frac{1}{4}\xi^2(x-y)^2\right)$

✓ Page 212 Eq 5.4.12: denominator 1st term $\sum_{g'=g+1}^G (\Sigma_{gg'} + \Sigma_{ag'}) \phi_g \rightarrow$
 $\left(\sum_{g'=g+1}^G \Sigma_{g'g} + \Sigma_{ag} \right) \phi_g$

✓ Page 213 last line: notation \rightarrow notion

✓ page 216 5th line: (5.4.21) \rightarrow ... (5.4.22)

✓ Page 217 1st line: that \rightarrow than

✓ Page 218 2nd paragraph: $\Gamma_p \gg E_i(1 - 1/\alpha_{res}) \rightarrow \Gamma_p \gg E_i(1/\alpha_{res} - 1)$

✓ Page 221 Eq 5.5.4: $\bar{\Sigma}_{gg'} \equiv \int \dots \Sigma_g(\underline{r}, E' \rightarrow E) \phi(\underline{r}, E')$

- ✓ Page 222 Eq 5.5.8 numerator $\bar{\phi}(f) \rightarrow \bar{\phi}(f)(E)$
- ✓ Page 222 Immediately after Eq 5.5.7: (5.5.1) \rightarrow (5.5.6)
- ✓ Page 223 Eq 5.5.9: $\Sigma_{t(f)}(E)\bar{\phi}(\underline{r}, E) \rightarrow \Sigma_{t(f)}(E)\phi(\underline{r}, E)$
In integrand $\phi(\underline{r}, E) \rightarrow \phi(\underline{r}, E')$
- ✓ Page 224 Eq 5.5.13: $\phi(\underline{r}, E)H^{(m)} \rightarrow \phi(\underline{r}, E')H^{(m)} dE$
- ✓ Page 225 Paragraph after Eq (5.5.17), 2nd line: "neutrons scattered into the energy interval of E within..." \rightarrow "neutrons appearing with energy E within..."
- ✓ Page 227 Eq 5.5.21, 2nd line: $\Sigma_{s(f)} \rightarrow \Sigma_{s(f)}^j$;
4th line from bottom of page: $\bar{\phi}(\underline{r}, E) \rightarrow \phi(\underline{r}, E)$;
last paragraph, title: Probabilities \rightarrow Densities
- ✓ Page 229 Eq 5.5.26: $\Sigma_{s(f)}^{res} \rightarrow \Sigma_{s(f)}^{res}(E)$
- ✓ page 231 3rd paragraph: "interval about dE " \rightarrow "interval about E "
- ✓ Page 234 Eq 5.6.9, 1st line of Eq: $dV_m^{(1)} \rightarrow dV_m^{(i)}$;
2nd line of Eq: $dV_f^{(i)} \rightarrow dV_f^{(1)}$
- ✓ page 235 2nd line after Equa. (5.6.12): "spatially flat within ..." \rightarrow "spatially flat and isotropic within ..."
- ✓ Page 240 line 8: $\underline{n}_1 \cdot \underline{\Omega} S dEdA(1-G_f^{(1)})/\Sigma_{t(f)}(E) \rightarrow$
 $\underline{n}_1 \cdot \underline{\Omega} S dEdAd\Omega(1-G_f^{(1)})/\Sigma_{t(f)}(E)$
- ✓ Page 243 Eq 5.6.36: $P_m(E) \rightarrow P_m^O(E)$; last line: $P_m(E) \rightarrow P_m^O(E)$
- ✓ Page 244 Eq 5.6.37: $P_m(E) \rightarrow P_m^O(E)$
- ✓ page 244 2nd line from bottom: "... appearing in dE ..." \rightarrow "... appearing at E ..."
- ✓ Page 245 Point (3), 1st line "... dE is flat within the fuel rod and flat within..." \rightarrow "... dE is flat and isotropic within the fuel rod and within..."

- ✓ Page 247 $E_c - E_1 \rightarrow E_c + E_1$; 2 lines after Eq 5.7.1: of a U^{28} atoms \rightarrow of U^{28} atoms
- ✓ Page 250 Eq 5.7.16: rhs $\bar{\sigma}_a^{28}(E) \rightarrow \sigma_a^{28}(E)$
- ✓ Page 251 Eq 5.7.20 denominator: $[\dots]\Sigma_{t(m)} \rightarrow \Sigma_{t(m)}(E)$
- ✓ Page 251 4th line from bottom: $P_f(E) \rightarrow P_f^0(E)$
- ✓ Page 255 Problem 4c: expected \rightarrow expected
- Page 263 Fig. 6.2 β^- 1.2m; 6.7h missing $Pa^{234} \rightarrow U^{234}$
- Page 265 Eq 6.2.6, 4th Eq: $\sigma_\alpha^{28} \rightarrow \sigma_a^{28}$
- Page 266 Paragraph beginning "For the highly enriched...": 3rd line: 4.7 \rightarrow 1.2; 10th line: 14 \rightarrow 13; 11th line 4.7 \rightarrow 1.2; 12th line: "...conversion leads to an increase of 0.65 percent in the U^{25} ..." \rightarrow "...conversion is equivalent to an increase of 0.17 percent in the initial U^{25} ..."
- Page 266 Next paragraph, line 2: 2.3 \rightarrow 6.05; 5th line $0.015 \times 0.023 = 0.000345 \rightarrow 0.015 \times 0.0605 = 0.00091$
- Page 268 Paragraph (beginning "Not only ...") 3rd line: $\exp(-\sigma_a^{24}\phi_1 t) \rightarrow \exp(-\sigma_a^{24}\phi_1 \Delta t)$; last line: $0.0000092 \rightarrow 0.0000088$
- Page 269 Eq 6.2.14, 6.2.15: all σ_a^{28} 's $\rightarrow \sigma_\gamma^{28}$
- Page 269 Eq 6.2.13, 2nd equation $\sigma_\gamma \rightarrow \sigma_\gamma^{28}$
- page 271 paragraph beginning "The simplest ... ": last word: $\sigma_a^f \rightarrow \sigma_a^{ff}$
- Page 273 Eq 6.3.6, 1st line, last term: $\exp(\sigma_{al}^{Sm}\phi_1 t) \rightarrow \exp -(\sigma_{al}^{Sm}\phi_1 t)$
- Page 274 Eq 6.3.9: denominator $\sigma_{al} \rightarrow \sigma_{al}^{Sm}$
- page 274 2 lines after Equa. (6.3.9): 13 years \rightarrow 32 years
- Page 275 Last paragraph: 3rd line: aborption \rightarrow absorption
- page 276 2 lines after Equa. (6.3.11): samaraium \rightarrow samarium

Page 277

Last paragraph, 1st line: 10 neutrons \rightarrow 10^8 neutrons

Page 279

Line 6, They \rightarrow Then

Page 286

Paragraph beginning "Since only..." 1st line: "...emitted in fission..." \rightarrow "...emitted in thermal fission..."

Page 293

Problem 3, last line: cross sections given \rightarrow cross sections and other assumptions given ...

Page 293

Problem 5: add $n^{24}(\tau)$ to both \int 's on l.h.s.; 2nd eq, last term: $n^4(\tau_{n+1}) \rightarrow n^{24}(\tau_{n+1})$

page 294

Problem 10a, Equa. beginning $J_2 \dots$; $+ \nu \Sigma_{f2} \rightarrow - \nu \Sigma_{f2}$

Page 294

Problem 10a: last line: $\bar{\phi} = \frac{1}{2}(\phi_1 + \phi_2)$

Page 297

Eqs 7.2.2, 7.2.3: $\int_0^\infty (\dots) dE$ (dE's missing)

Page 298

Eq 7.2.4: $c_i(\underline{r}, E) \rightarrow c_i(\underline{r}, t)$; Eq 7.2.5: $\chi_p^j \rightarrow \chi_p^j(E)$

Page 299

Eq 7.2.7: $\frac{d}{dt} \rightarrow \frac{\partial}{\partial t}$

Page 310

Eq 7.5.12 $\exp(-0.068t) \rightarrow \exp(-0.0695t)$

Page 310

Eq 7.5.12: 0.0113 \rightarrow -.113

Page 312

6th line from bottom: 1.5 millisecond \rightarrow 15 millisecond

page 313

1st line: 1.5 millisecond \rightarrow 15 millisecond

Page 318

Eq 7.6.4: Denominator: $\chi F(\delta S) \rightarrow \chi F_0(\delta S)$

Page 323

1st paragraph, 2nd line: \rightarrow If we add at some point \underline{r} a sample $\eta \dots 10^6$ - all having energy E and an isotropic ... etc.

Page 324

7 lines from bottom: Equation (7.6.16) \rightarrow Equation (7.6.17)

Page 325

1st line of paragraph below Eq 7.6.21: solution of (7.6.17) \rightarrow solution of (7.6.18)

Page 326

Second paragraph \rightarrow "When the reactivities...and $\delta(\chi F)$ are desired,..."

Page 327

Eq 7.7.2, 2nd line $S_{g'}(\underline{r})$'s $\rightarrow S_{og'}(\underline{r})$'s

Page 327

Eq 7.7.1, Numerator: $-\sum_{g'=1}^G [] \rightarrow +\sum_{g'=1}^G []$;

$\nabla\phi_g^*(\underline{r}) \rightarrow \nabla\phi_{og}^*(\underline{r})$; $\delta\Sigma_{tgg'}(\underline{r},t) \rightarrow \delta\Sigma_{sgg'}(\underline{r},t)$

Page 330

Problem 4: Assume $a_1(t)$ and $a_2(t)$ are known

page 331

Problem 7: $C_i(T) \rightarrow C_i(t)$

Page 333

Paragraph 4, line 3: deriving \rightarrow derive

Page 336

line 14: contaning \rightarrow containing

page 339

last 3 lines \rightarrow "all having energies E and being introduced isotropically at point \underline{r} in a critical ... "

Page 340

line 6: ...having energies E, directions of travel $\underline{\Omega}$ and all introduced into the reactor at point \underline{r} . These neutrons ...

Page 355

last line: ... if any orthogonal polynomials ...

Page 356

last line Eq 8.4.13: $\Psi_m(E')$ \rightarrow $\Psi_m(z, E')$

Page 357

Figure 8.3: ϕ' measured in wrong sense

Page 357

Eq 8.4.15: $\Psi_m(E')$ \rightarrow $\Psi_m(z, E')$; $\Sigma_{sn}(E' \rightarrow E) \rightarrow \Sigma_{sn}(z, E' \rightarrow E)$;

$\sum_{n=0}^{\infty} []$ - add brackets line 4 ; $\psi_n(E) \rightarrow \psi_n(zE')$

Page 358

2nd line after 8.4.16: $N \rightarrow N+1$

Page 359

Sentence beginning on 2nd line should be "For slab geometry this procedure...etc."

✓ Page 361 line 1: (usually complex) \rightarrow either real or pure imaginary

line 21: $\int d\Omega F_{\pm B_m}(\Omega, E) \rightarrow \int d\Omega F_{\pm L}(\Omega, E)$

line 25: $\exp(+Z/L) \rightarrow \exp(+z/L)$

✓ Page 362 4th line from bottom: $Y_r^P(\Omega) \rightarrow \bar{Y}_r^P(\Omega)$

Page 363 ✓ 1st line after 8.4.23: all $l > L \rightarrow$ all F_l with $l > L$

Page 364 ✓ 1st line after 8.4.24: $\Sigma'_s(E' \rightarrow E, \mu) \rightarrow \Sigma_s(E' \rightarrow E, \mu)$

Page 365 ✓ Eq 8.4.27, 2nd line: $\Sigma_t(E') F_{o(B)}(E) \rightarrow \Sigma_t(E') F_{o(B)}(E')$

✓ Page 366 ✓ Eq 8.4.33, 2nd line: $d\phi \rightarrow d\phi/2\pi$

page 368 ✓ Equa. 8.4.35: $\Sigma_f^j(\Omega, E') \psi_o^0(\underline{r}, E) \rightarrow \Sigma_f^j(\underline{r}, E') \psi_o^0(\underline{r}, E')$

Page 368 ✓ Eq. 8.4.36: 1st term: $(n+3) \rightarrow (2n+3)$

Page 370 ✓ Eq 8.4.38, 2nd line: $\dots + \Sigma_{so}(x, y, E' \rightarrow E) \left[\sum_{d'=1}^4 \frac{1}{4} \psi(x, y, \Omega_{d'}, E') \right]$
 $\rightarrow \dots + \Sigma_{so}(x, y, E' \rightarrow E) \left[\sum_{d'=1}^4 \frac{1}{4} \psi(x, y, \Omega_{d'}, E') \right]$

Page 373 ✓ line 4: $\alpha E - E$ should be $\alpha E \rightarrow E$

✓ Paragraph 3, line 6: for small Δx becomes $\Sigma_t \Delta x \exp(-\Sigma_t \Delta x) \rightarrow$
for small Δx becomes $\Sigma_t \Delta x \exp(-\Sigma_t x)$

Page 375 ✓ 2nd paragraph, line 5: tables of ρ versus $x \rightarrow$ tables of F versus x ;

2nd paragraph, line 6: number ρ is found \rightarrow number F is found

Page 377 ✓ Eq 8.4.49, 2nd line $\rightarrow \langle \xi^2 \rangle$ being an expected value defined by $\langle \xi^2 \rangle =$ etc.

page 377 ✓ 2nd paragraph from bottom; last line: "error is $\pm \epsilon$ "
"error is $\langle |\epsilon| \rangle$ "

page 382 ✓ 3rd line: for $0 \leq \mu < 1 \rightarrow$ for $0 < \mu \leq 1$

Page 382 ✓ Prob. 10: $\langle \psi_n^{(\lambda)*} | L^{-1} | Q \rangle \rightarrow \langle \psi_n^{(\lambda)*} | Q \rangle$

Page 383 ✓ Prob. 17.a. 2nd line: delete period and add "and $\Sigma_{sn} = 0, n > 1$."

Page 384 ✓ Prob. 19 lines 2 and 3 should have $x = 0$ to $x = x_1$ and ... extends from x_1 to ∞ .

Page 384 ✓ Problem 21: Hint: Problem 7 \rightarrow Problem 11

page 386 ✓ last paragraph; line 4: from \rightarrow form

Page 387 ✓ $\Sigma_f^j(E')$ in 1st of Eq 9.2.1 and $\Psi_1(E')$ in 2nd $\rightarrow \Sigma_f^j(z, E')$ and $\Psi_1(z, E')$

Page 387 ✓ Eq 9.2.6: $\frac{\partial}{\partial z} \left[\tilde{D} \frac{\partial}{\partial z} \phi(z, E) \right] \rightarrow -\frac{\partial}{\partial z} \left[\tilde{D} \frac{\partial}{\partial z} \phi(z, E) \right]$

Page 389 ✓ Paragraph 9.3, 4th line: $\Sigma_s(z, E' \rightarrow E) \rightarrow \Sigma_s(z, u_0, E' \rightarrow E)$

Page 395 ✓ Eq 9.3.23: $J(\underline{r}, E) \rightarrow \underline{J}(\underline{r}, E)$

Page 395 ✓ Eq 9.3.24: $-\Sigma_t(\underline{r}, E)\phi(\underline{r}, E) \rightarrow +\Sigma_t(\underline{r}, E)\phi(\underline{r}, E)$

Page 395 ✓ last line: (9.3.23) \rightarrow (9.3.24); (9.3.26) \rightarrow (9.3.27)

Page 396 ✓ Last of Eq 9.4.3: $A_{lgg', u} \rightarrow A_{lgg', u}(\underline{r})$; $\Sigma_t(\underline{r}, E) \rightarrow \Sigma_t(\underline{r}, E')$

Page 397 ✓ last line in paragraph after (9.4.8): positive \rightarrow non-negative

Page 397 ✓ Eq 9.4.9: $\frac{\partial}{\partial u} \phi_g(u) \rightarrow \frac{\partial}{\partial u} \phi_g(r)$

Page 401 Lines 5 and 6: $= 0 \rightarrow = 0$ or ∞

Page 403 ✓ Last paragraph, 3rd line should be "...can be approximated by integrals over ΔE_g and $\Delta E_{g'}$ of unnormalized pieces..."

Page 403 ✓ Eq 9.4.25: Remove ΔE_n

Page 403 ✓ Eq 9.4.26: Remove ΔE_n

Page 403 ✓ Eq 9.4.28: Remove ΔE_n

Page 404 ✓ Eq 9.4.29: $-\nabla \cdot D_g \nabla \phi \rightarrow -\nabla \cdot D_g(\underline{r}) \phi_g(\underline{r})$

Page 405 ✓ last line: $[\tilde{D}] \rightarrow [\tilde{D}_u]$

Page 406 ✓ Paragraph 4, line 2: $\delta(E' \rightarrow E) \rightarrow \delta(E' - E)$

page 412 ✓ Item (3); 1st line: "is taken as $\sum_{s1}, \delta(E' - E)$ " →
"is taken as $\sum_{s1}(E') \delta(E' - E)$ "

Page 424 ✓ Problem 3, part c: $\delta\left(\mu \pm \frac{\pi}{4}\right) \rightarrow \delta\left(\mu \pm \cos \frac{\pi}{4}\right)$

Page 425 ✓ Problem 12: r.h.s. of expression for $q_1(u)$ should be negative
$$\left(-\sum_{n=0}^{\infty}\right)$$

last equation: $\Psi_1 \rightarrow F_1$

page 432 ✓ 2nd line: "between vectors" → "between column vectors"

page 435 ✓ Equa. 10.3.10; 3rd line; (1,1) element of the matrix:
 $\frac{1}{4!} \kappa^2 \Delta^4 \rightarrow \frac{1}{4!} \kappa^4 \Delta^4$

Page 437 ✓ Eq (10.3.23):

$$\Omega \equiv \begin{bmatrix} \omega_1 & 0 \\ 0 & \omega_2 \end{bmatrix}$$

Page 440 ✓ Eq 10.3.33: $\int_{-1}^1 \rightarrow \int_{-1}^1$

page 441 ✓ Equa. (10.3.38) r.h.s. -
$$\int_0^{2\pi} \frac{d\phi'}{2\pi} \int_{-1}^1 \frac{d\mu'}{2} \int_0^{\infty} dE' \Sigma_s(E', \mu_0) \text{ etc}$$
$$= \int_0^{2\pi} \frac{d\phi'}{2\pi} \int_{-1}^1 \frac{d\mu'}{2} \Sigma_s(E, \mu_0) \psi(x_1, \mu', E)$$

Page 443 ✓ Line 1: one-speed → one-group

page 447 ✓ 2nd paragraph from bottom; 4th line: material → material

Page 448 ✓ In the \int 's: $y_i \rightarrow y_j$

Page 452 ✓ Last line of text: (10.3.18) → (10.3.13)

page 461 Equa. 11.2.4; 2nd line from bottom: $[V_1(E')J_1(z) + V_2(E')J_2(z)]$
 $\rightarrow [V_1(E)J_1(z) + V_2(E)J_2(z)]$

Page 462 Eq 11.2.10: ... $\frac{d}{dz} \begin{bmatrix} \phi_1(z) \\ \phi_2(z) \end{bmatrix} + [A(z)] \begin{bmatrix} \phi_1(z) \\ \phi_2(z) \end{bmatrix} \dots$

Page 464 ✓ Line 18: $U_1(E), U_2(E) \rightarrow V_1(E), V_2(E)$

Page 467 ✓ Eq 11.2.17, first line: $-\Sigma_1 \Psi_2^1 T_1^1 \rightarrow -\Sigma_1 \Psi_1^1 T_1^1$

Page 470 ✓ Eq 11.2.26: ... $\frac{1}{\lambda} \int [W_j][M] \dots$ etc.

Page 473 ✓ $\Psi_{1,m,n}(x,y,z) = \sin \frac{1\pi x}{L_x} \sin \frac{m\pi y}{L_y} \sin \frac{n\pi z}{L_z}$

Page 474 ✓ Eq 11.3.4, last line: denominator is $\int v \Sigma_f (\phi_0 + \delta\phi)^2 dV$

Page 475 ✓ Eq 11.3.9: $\Sigma_a \rightarrow \Sigma$

Page 476 ✓ Eq 11.3.10, numerator: $\int [D\nabla\phi \cdot \nabla\phi + \Sigma\phi^2] dV$

Page 476 ✓ #5. should read: "The function ϕ that makes $F(\phi)$ stationary and takes on a minimum value with respect to first-order variation in $F(\phi)$ is..."

Page 477 ✓ Eq 11.3.13, 2nd line:

$$+ \Sigma(x) \cos \frac{\pi x}{2l} \sin \frac{\pi x}{l} \rightarrow - \Sigma(x) \cos \frac{\pi x}{2l} \sin \frac{\pi x}{l}$$

Page 479 ✓ Eq 11.3.15: $= \{ \int \dots \rightarrow \{ \int \dots$

Page 480 ✓ Eq between 11.3.16 and 11.3.17 should be:

$$\left\{ 1 - \frac{\int [\delta U^*]^T [\chi v \Sigma_f^T] [U] d\underline{r} + \int [U^*]^T [\chi v \Sigma_f^T] [\delta U] d\underline{r}}{\int [U^*]^T [\chi v \Sigma_f^T] [U] d\underline{r}} \right\}$$

Page 481 ✓ Eq 11.3.18, last line: $[\delta U]^T \nabla \cdot [\underline{v}^*] - \nabla \cdot ([\underline{v}^*]^T [\delta U]) + \dots$

- Page 483 Eq 11.3.23, middle line: $x_N - \frac{h_{N-1}}{2} < x \leq x_N$
- Page 488 Eq 11.4.5, 1st term, 2nd line: $\frac{d}{dx} \rightarrow \frac{\partial}{\partial x}$
- Page 489 Last paragraph, 1st line [A] \rightarrow [a]
- Page 493 Eq 11.4.15:
- $$\sum_{n=1}^{N-1} \rightarrow \sum_{n=0}^{N-1}$$
- Page 494 Eq 11.4.17, 3rd line:
- $$\sum_{k=1}^K \rightarrow \sum_{k=1}^K \sum_{n=1}^{N-1}$$
- Page 495 Eq 11.4.18: dz's missing from all integrals over Z-ranges
- Page 502 Eq 11.5.7: $\nabla[\delta U^*] \rightarrow \nabla[\delta U^*]^T$
- Page 507 Eq 11.5.20: 1st line $h_k [D_{k-1}]^{-1} \rightarrow h_{k-1} [D_{k-1}]^{-1}$
- Page 510 First term of equation: $u_j^0(y) \rightarrow u_j^{1+}(y)$; also
- $$\left(\frac{x-x_{k-1}}{h_{k-1}(x)} \right) \rightarrow \left(\frac{x-x_{k-1}}{h_{k-1}} \right)^2$$
- Page 510 Last term of Eq: $-\left(\frac{y_{j+1} - y}{h_j(y)} \right) \rightarrow -\left(\frac{y_{j+1} - y}{h_j} \right)^3$
- Page 514 7 lines from bottom: $T_i(x,y) = 0 \rightarrow T_i(x,y) \neq 0$
- Page 516 4th text line from bottom: points 15, 16, 13 \rightarrow points 15, 16, 18
- Page 521 Eq 11.6.1: r.h.s.
- $$\int_{v_n} [\bar{\varphi}(\underline{r})] dV \rightarrow \int_{v_n} [\phi(\underline{r})] dV$$
- Page 525 Eq 11.6.4, last term, denominator: $h_i \rightarrow h_i(x)$
- Page 528 2nd line, paragraph after Eq. 11.6.15: group-g \rightarrow group-g'
- Page 535 Line 6: $y_j - y_{j+1} \rightarrow y_j \rightarrow y_{j+1}$
- Page 536 4th line from bottom: $[J_i^\pm(y)] \rightarrow [J_j^\pm(y)]$
- Page 544 ✓ Maxwellian distribution 302 \rightarrow 202