ERRATA

THERMAL RADIATION HEAT TRANSFER, 5TH Edition, 1st Printing

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Page

15 Three lines before Eq. (1.7), $I_{\lambda b}$ should be $I_{\lambda b,n}$

18 Example 1.2, in the equation, I_λ (0.55 μm) should be $I_{\lambda b}$ (0.55 μm)

19 On Figure 1.11, label on vertical axis should be

Spectral blackbody emissive power $(W/m^2 \cdot \mu m)$

22 Line before Eq. (1.25), "(Equation 1.22)" should be "(Equation 1.24)"; two lines after Eq. (1.25), $\lambda_{\max}$ should be $I_{\lambda_{\max} b}$

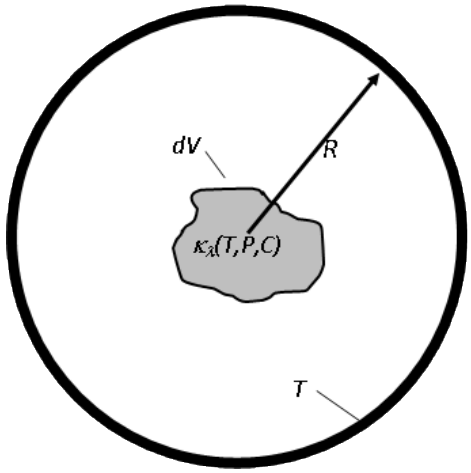
26 Second line, $E_{\lambda_1 T \to \lambda_2 T}$ should be $F_{\lambda_1 T \to \lambda_2 T}$

31 Line before Eq. (1.36), "(Equation 1.35)" should be "(Equation 1.34)"

32 In footnote, "(Equation 11.3)" should be "(Equation 1.37)"

33 First sentence in Section 1.6.3: "(Equation 1.40)" should be "(Equation 1.37)"

34-5 Fig. 1.17 should be replaced with figure below:



36 Line 6, "intensity in direction (θ_i, ϕ_i)…" should be changed to "intensity in direction (θ, ϕ)…"

Line below Equation 1.57, reword as "…the scattering phase function, which is a measure of the amount of radiating energy propagating in $\Omega_i(\theta_i, \phi_i)$ that is redirected into $\Omega(\theta, \phi)$, and can be……"

37 In equations (1.63) and (1.64), the last minus sign (on the integral terms) should be changed to plus.

60 In Figure 2.7, interchange $d\Omega_i$ and $d\Omega$ in parts (a) and (b).

Figure caption should now read:

FIGURE 2.7: Equivalent ways of showing energy from dA_i that is incident on dA. (a) Incidence within solid angle $d\Omega$ having origin at dA_i; incidence within solid angle $d\Omega_i$ having origin at dA.

89 In Eq. (3.1), θ_1 should be θ_i

90 Eq. (3.4a) should be:

$$\rho_{\|} = \left[\frac{\tan(\theta_i - \chi)}{\tan(\theta_i + \chi)}\right]^2$$

Eq. (3.7a) should be:

$$\rho(\theta_i) = \frac{1}{2}\frac{\sin^2(\theta_i - \chi)}{\sin^2(\theta_i + \chi)}\left[1 + \frac{\cos^2(\theta_i + \chi)}{\cos^2(\theta_i - \chi)}\right]$$

Eq. 3.7b should be:

$$\rho_n = \rho(\theta = 0) = \left(\frac{n_2 - n_1}{n_2 + n_1}\right)^2 = \left[\frac{(n_2/n_1) - 1}{(n_2/n_1) + 1}\right]^2$$

93 In Eq. (3.8), the third term on the right should be

$$-\frac{n^2(n^2-1)^2}{(n^2+1)^3}\ln\left(\frac{n-1}{n+1}\right)$$

94 In Eq. (3.10), θ should be θ_i

Eq. (3.11a) should be:

$$\rho_{\lambda,\|}(\theta_i) = \frac{a^2 + b^2 - 2a\sin\theta_i\tan\theta_i + \sin^2\theta_i\tan^2\theta_i}{a^2 + b^2 + 2a\sin\theta_i\tan\theta_i + \sin^2\theta_i\tan^2\theta_i}\rho_{\lambda,\perp}$$

Eq. (3.12b) should be:

$$b^2 = \frac{1}{2}\{[(n^2 - k^2 - \sin^2\theta_i)^2 + 4n^2k^2]^{1/2} - (n^2 - k^2 - \sin^2\theta_i)]\}$$

102 Eq. (3.28) should be

$$\varepsilon_n(T) = 0.0348T\sqrt{r_{e.273}}$$

229 Top equation, 4th line T_3 should be ϑ_3

325 In Problem 6.15, First line should read "In Figure 6.25, ……"

450 Eq. (9.5) should be

$$\frac{\kappa_{\eta,ij}}{S_{ij}} = \frac{1}{\gamma_D}\sqrt{\frac{\ln 2}{\pi}}\exp\left[-\left(\eta-\eta_{ij}\right)^2\frac{\ln 2}{\gamma_D^2}\right]$$

463 Eq.(9.33a) should be $$\alpha(T) = \alpha_0\frac{1-\exp\left(-\sum_{k=1}^{m}u_k\delta_k\right)}{1-\exp\left(-\sum_{k=1}^{m}u_{0,k}\delta_k\right)}\left[\frac{\Psi(T)}{\Psi(T_0)}\right]$$

464 In Table 9.2, the α_0 values for CO_2 should be $2.47\text{x}10^{-9}$ and $2.48\text{x}10^{-9b}$

465 Eqs. (9.33c,d) should be:

$$\Psi(T) = \frac{\prod_{k=1}^{m}\sum_{\upsilon_k=\upsilon_{0,k}}^{\infty}\left\{\left(\upsilon_k+g_k+|\delta_k|-1\right)!/\left[\left(g_k-1\right)!\upsilon_k!\right]\right\}e^{-u_k\upsilon_k}}{\prod_{k=1}^{m}\sum_{\upsilon_k=0}^{\infty}\left\{\left(\upsilon_k+g_k-1\right)!/\left[\left(g_k-1\right)!\upsilon_k!\right]\right\}e^{-u_k\upsilon_k}}$$

$$\Phi(T) = \frac{\left[\prod_{k=1}^{m}\sum_{\upsilon_k=\upsilon_{0,k}}^{\infty}\left(\left\{\left(\upsilon_k+g_k+|\delta_k|-1\right)!/\left[\left(g_k-1\right)!\upsilon_k!\right]\right\}e^{-u_k\upsilon_k}\right)^{1/2}\right]^2}{\prod_{k=1}^{m}\sum_{\upsilon_k=\upsilon_{0,k}}^{\infty}\left\{\left(\upsilon_k+g_k+|\delta_k|-1\right)!/\left[\left(g_k-1\right)!\upsilon_k!\right]\right\}e^{-u_k\upsilon_k}}$$

466 In Example 9.1, second paragraph of solution, first line, Equation 9.32c should be Equation 9. 33c; next to last line, same paragraph, same correction; last line, Equation 9.32a should be Equation 9. 33a.

In third paragraph of solution, last line, Equation 9.32d should be Equation 9. 33d and Equation 9.32b should be Equation 9. 33b.

4th paragraph in the solution, $\omega = \omega_0\left(\frac{T}{T_0}\right)^2$ should be $\omega = \omega_0\left(\frac{T}{T_0}\right)^{1/2}$

In fifth paragraph of solution, $u=\lambda\alpha/\omega$ should be $u=X\alpha/\omega$.

and, in 6th paragraph, $P_e = \left[\frac{P}{P_0}+\frac{P}{P_0}\left(b-1\right)\right]$ should be $P_e = \left[\frac{P}{P_0}+\frac{P}{P_0}\left(b-1\right)\right]^n$

467 First line in Section 9.3.3.1 should read: "To find solutions for total radiative energy transfer, the transfer equations described in Chapter 1 ……"

481 Fig. 9.14, In caption, bar/cm should be bar·cm

482 Fig. 9.15, In caption, bar/cm should be bar·cm

483 In Example 9.5, 4th line of solution, labels a_1, a_2, a_3 should be a_0, a_1, a_2.

Third line from bottom, (bar·atm) should be (bar·cm)

495 First sentence in Section 10.3.1 should refer to (Equation 1.63) and not (Equation 1.24).

514 In Eq. 10.75b, in the next to last term, the $E_{\lambda b,g}$ should read $E_{\lambda b,2}$ so the equation becomes:

$$-F_{2-1}\frac{1-\epsilon_{\lambda,1}}{\epsilon_{\lambda,1}}\bar{t}_{\lambda,2-1}q_{\lambda,1}+\frac{1}{\epsilon_{\lambda,2}}q_{\lambda,2}=-F_{2-1}\bar{t}_{\lambda,2-1}E_{\lambda b,1}-F_{2-1}\bar{\alpha}_{\lambda,2-1}E_{\lambda b,2}+E_{\lambda b,g}$$

518 In Table 10.1, the final exponential integral term in the second and third table entries should be

$$E_3\left[\kappa_\lambda h\sqrt{(R/h)^2+1}\right]$$

527 Example 10.6, final equation should be

$$Q_i=GA=\epsilon_{CO_2}\sigma T_g^4A=0.170\times5.6704\times10^{-8}(1100)^4\times16\pi=709kW$$

538 In Eq. (11.11), last term, should be +, not -.

538 In Eq. (11.17), last term, should be +, not -.

598 In text line after Eq. 12.47, Equation 15.38 should be Equation 12.38

642 Eq. (13.90) should be $\sigma T^4(\tau)=\sigma T_1^4-(\tau+1/\epsilon_1-1/2)q_r$

668 One line above Eq. (13.134: Equation 17.127 should be Equation 13.127.

675 Liner Eq. (13.156), Equation 17.49 should be Equation 13.156

745 In Homework Problem 14-4, (λ = 0.514 mm) should be λ = 0.514 μm)

751 Eq. (15.5) should be $C_\lambda=C_{\lambda,\kappa}+C_{\lambda,s}$ $Q_\lambda=Q_{\lambda,\kappa}+Q_{\lambda,s}$

753 Second paragraph, line 3, replace *x* with ξ.

765 In Eq. (15.24), top relation should be

$$C_{s,\lambda}=\frac{24\pi^3V^2\left[\left(n^2-k^2-1\right)\left(n^2-k^2+2\right)+4n^2k^2\right]^2+36n^2k^2}{\lambda^4\left[\left(n^2-k^2+2\right)^2+4n^2k^2\right]^2}$$

771 Two lines above Eq. (15.37), replace "*absorption* efficiency…" with "*absorption* cross-section…"

776 In requirement (ii), line 2, replace "decrease" with "decreases"

785 Solutions to HW 15.1 should be:

Answer: 1.35x10^{-5} μm^2; 3.90x10^9 cm^{-3}; 1.64x10^{-8}; 31.6x10^{-8} g.

787 paragraph 1, line 6. Add "(RTE)" after "radiative transfer equation".
paragraph 3, lines 2 and 3. Should read "In addition, the RTE can be derived from […]" instead of "In addition, the radiative transfer equation (RTE) can be derived from […]".
paragraph 3, line 3. Change "EM" to "electromagnetic".
paragraph 3, line 4. Change "Section 14.5" to "Section 14.6".

788 paragraph 4, line 13. Should read "[…] by exciting surface waves having a high degree […]" instead of "[…] by exciting surface waves a having a high degree […]".
paragraph 5, line 3. Change "micro electro-mechanical systems" to "micro-electro-mechanical systems".

794 Equation (16.12). The left-hand side of Eq. (16.12) should be "$u(\omega,T)$" and not "$u(\omega T)$".

795 paragraph 1, line 3. Remove "the" before "near-field thermal radiation".

802 Equation (16.26). There is an error in the last *g*-term on the right-hand side of Eq. (16.26). The subscript should be "$sl\rho\alpha$" instead of "$sl\phi\alpha$". For clarity, the correct Eq. (16.26) is given below:

$$q_{\omega,sl}(z_c) = \frac{k_0^2 \Theta(\omega, T_s)}{\pi^2} \mathrm{Re}\left\{ iK_s''(\omega) \int_0^\infty k_\rho dk_\rho \int_z dz' \begin{pmatrix} g^E_{sl\rho\alpha}(k_\rho, z_c, z', \omega) g^{H*}_{sl\phi\alpha}(k_\rho, z_c, z', \omega) \\ -g^E_{sl\phi\alpha}(k_\rho, z_c, z', \omega) g^{H*}_{sl\rho\alpha}(k_\rho, z_c, z', \omega) \end{pmatrix} \right\}$$

810 paragraph 3, line 5. The reference should be "Kittel et al. (2005b)" and not "Kittel et al. (2005)".

815 Homework problem 16.7. The reference should be "Greffet et al. (2002)" and not "Greffet et al. (1998)".