Optical Systems and Processes — Errata

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p. 8: Eq. 2.9, replace E' by E
p. 23: Eq. 3-16, replace variables on right side:

$$\mathcal{F}\text{comb}(ax)\text{comb}(by) = \frac{1}{|ab|}\text{comb}\left(\frac{u}{a}\right)\text{comb}\left(\frac{v}{b}\right)$$

p. 99: insert brackets in Eq. 5-62,

$$\frac{K}{2\pi} = \frac{k}{2\pi}\sin\theta \approx \frac{1}{\lambda f}\left(\frac{3H}{2} + G\right)$$

p. 100 Eq. 5-63, delete factor 2:

$$\frac{K_h}{2\pi} = \frac{1}{\lambda f}H \ .$$

p. 156 and 158: In the second exponential term the sign of ϕ_2 should be - instead of +.
p. 295 above Eq. 12-40, it should be C = -1
p. 347: Eq. A-14

$$\mathcal{Q}[a]\mathcal{S}[\mathbf{s}] = \mathcal{S}[\mathbf{s}]\mathcal{G}[a\mathbf{s}]\mathcal{Q}[a]\mathcal{Q}_s[a]$$

—— Eq. A-20

$$\mathcal{G}[\mathbf{m}]\mathcal{S}[\mathbf{s}] = \mathcal{S}[\mathbf{s}]\mathcal{G}[\mathbf{m}]\mathcal{G}_s[\mathbf{m}]$$

—— Eq. A-28

$$\mathcal{V}[b]\mathcal{R}[d] \ = \ e^{jkd(1-1/b^2)}\mathcal{R}\left[\frac{d}{b^2}\right]\mathcal{V}[b]$$

p. 348: Eq. A-30

$$\mathcal{S}[\mathbf{s}]\mathcal{G}[\mathbf{m}] = \mathcal{G}[\mathbf{m}]\mathcal{G}_s[-\mathbf{m}]\mathcal{S}[\mathbf{s}]$$

— Eq. A-42

$$
\begin{aligned}
& \mathcal{R}[d]\mathcal{Q}[1/q] = \\
= \quad & \frac{q}{d+q} e^{jkd\left(1-\frac{q}{q+d}\right)} \mathcal{Q}[1/(d+q)]\mathcal{V}[1/(1+d/q)]\mathcal{R}[(1/d \ + \ 1/q)^{-1}] \\
= \quad & \frac{q}{d+q} e^{jkd\left(1-\frac{q}{q+d}\right)} \mathcal{Q}[1/(d+q)]\mathcal{R}[d(1 \ + \ d/q)] \ \mathcal{V}[1/(1+d/q)]
\end{aligned}
$$

p. 349: Eq. A-43

$$\mathcal{R}[d]\mathcal{G}[\mathbf{m}] \ = \ \mathcal{Q}_{\mathbf{m}}[-d]\mathcal{G}[\mathbf{m}]\mathcal{S}[\mathbf{m}d]\mathcal{R}[d] \ ,$$

p. 370: The solution to problem 6 should be:

Denoting the Gaussian beam parameter in front of the boundary by q we have that the beam parameter is transformed at the boundary in a similar way as a quadratic phase factor (Eq. 4.41), thus $q \rightarrow q' = q/n$. Using the Gaussian beam relations we have,

$$q = q_0 - z$$

since we observe the beam in front of the waist. When the beam propagates in the dielectric medium, the apparent distances determined by the appropriate FPO (Eq. 4.43) are reduced by a factor n. Accordingly, the beam propagating within the dielectric medium a longer distance satisfies the relation,

$$q' = qn = q'_0 - z' = nq_0 - nz \ .$$

Since q_0 and q'_0 are pure imaginary while z and z' are real, we must have,

$$q'_0 = q_0 n \rightarrow w'_0 = w_0 \ ; \quad z' = nz$$

These are important consequences. First of all, if we focus a Gaussian beam to a point in space and then place a dielectric medium in front of the waist position, the waist size and its apparent position (from outside) remains the same but the actual waist position is displaced by an amount proportional to the fractional change of the wavelength.

p. 373: Question 3a should refer to Fig. 5-23

p. 407: Above Eq. C-191, reference should be to question 6 of chapter 5

p. 408: Above Eq. C-195, reference should be to question 6 of chapter 5