

## Front Matter

1. Page xxii, Reference [4] – The complete reference is:  
Rumpf, R. C., “Design and optimization of nano-optical elements by coupling fabrication to optical behavior,” University of Central Florida, 2006.

## Chapter 1

1. Page 9, Figure 1.4(a) – The  $f_{32}$  term in the first column should be  $f_{31}$ .
2. Page 29, between lines 20 and 21 of the code – Add `ya = ya - mean(ya)`.

## Chapter 2

3. Page 37, fourth line below Eq. (2.25) – There should be an ‘r’ subscript on the complex relative permittivity term. The sentence should read “...the relative permittivity becomes complex  $\tilde{\epsilon}_r$ .”
4. Page 37, first line above Eq. (2.27) – There should be an ‘r’ subscript on the complex relative permittivity term. The sentence should read “The complex relative permittivity  $\tilde{\epsilon}_r$ ...”
5. Page 37, second line below Eq. (2.29) – There should be an ‘r’ subscript on the complex relative permeability term. The sentence should read “...also a complex number  $\tilde{\mu}_r$ .”
6. Page 38 and 39, Eqs. (2.34), (2.36) and (2.38) – There should not be an ‘r’ subscript on the permittivity terms because it is not the relative permittivity being described here. That is, each occurrence of  $[\epsilon_r]$  should be written as  $[\epsilon]$ .
7. Page 38 and 39, Eqs. (2.35), (2.37) and (2.39) – There should not be an ‘r’ subscript on the permeability terms because it is not the relative permeability being described here. That is, each occurrence of  $[\mu_r]$  should be written as  $[\mu]$ .
8. Page 39, third line below Eq. (2.37) -- There should not be an ‘r’ subscript on the permittivity term. The sentence should read as “...in the tensor  $[\epsilon]$  is interpreted...”
9. Page 39, fifth line below Eq. (2.37) -- There should not be an ‘r’ subscript on the permeability term. The sentence should read as “...in the tensor  $[\mu]$  is interpreted...”
10. Page 45, first line on page – The exponential should not have  $j$  and should be written as  $\exp(-k_0 \kappa z)$ .
11. Page 47, third line after Eq. (2.84) – “...negative –...” should be “...positive +...”
12. Page 47, fifth line after Eq. (2.84) – “...positive +...” should be “...negative –...”
13. Page 47, Eq. (2.85) – The left side of the equation should be  $\vec{E}(\vec{r})$ .
14. Page 48, Figure 2.3(b) – In the caption associated with left circular polarization in part (b) of figure, the equation should be  $\vec{P} = E_0(\hat{a}_x + j\hat{a}_y)$ .
15. Page 48, Figure 2.3(c) – In the caption associated with right circular polarization in part (c) of figure, the equation should be  $\vec{P} = E_0(\hat{a}_x - j\hat{a}_y)$ .
16. Page 48, Figure 2.3(d) – In the caption associated with elliptical polarization in part (d) of figure, the acronym for “elliptical polarization” is incorrectly written as LP. It should be written as EP.

17. Page 51, Equation (2.90) – The correct equation for  $\hat{a}_{\text{TM}}$  is  $\hat{a}_{\text{TM}} = \frac{\vec{k}_{\text{inc}} \times \hat{a}_{\text{TE}}}{|\vec{k}_{\text{inc}} \times \hat{a}_{\text{TE}}|}$ .
18. Page 51, line immediately above Eq. (2.91) – The variable  $P_{\text{TE}}$  should be  $p_{\text{TE}}$  and the variable  $P_{\text{TM}}$  should be  $p_{\text{TM}}$ . The Ps should be lower-case to be consistent with the same variables in Eq. (2.91).
19. Page 52, sentence immediately after Eq. (2.96) – Sentence should be “...in the  $\vec{H}^*$  term...”
20. Page 54, last line in caption for Figure 2.5 – The “a” should not appear in this line.
21. Page 58, Equation (2.125) – The  $\hat{a}_y$  unit vector should be  $\hat{a}_z$ .
22. Page 58, paragraph just above Eq. (2.126) – The inline equation  $K = \left(\frac{2\pi}{\Lambda}\right) \hat{a}_x$  should be  $\vec{K} = (2\pi/\Lambda) \hat{a}_x$ .
23. Page 58, Equation (2.126) – The  $\hat{a}_y$  unit vector should be  $\hat{a}_z$ .
24. Page 60, first line after Eq. (2.133) – The inline equation should be  $|\vec{E}_{0,\text{inc}}| = 1$ .
25. Page 61, Figure 2.7 – The axes for  $x$  and  $y$  should be reversed so that the coordinate system is right-handed.
26. Page 67, Equation (2.158) – The equation needs a square root on the rightmost expression to read  $\gamma = \alpha + j\beta = \sqrt{(R + j\omega L)(G + j\omega C)}$ .
27. Page 68, Figure 2.10 – The scale factor should be  $s = d_2/d_1$ .

### Chapter 3

1. Page 74, first line after Eq. (3.7) – The mathematical expression  $f(x)$  should be  $f(x)$ . The parentheses should not be italicized.
2. Page 75, last sentence in paragraph immediately after Eq. (3.10) – The sentence should read as “A finite-difference approximation derived from  $n$  points is said to be  $n$ th-order accurate.”
3. Page 78, first line in Section 3.2.3 – The sentence should start as “All of the finite-difference approximations...”
4. Page 79, second line after Eq. (3.36) – The sentence should end as “...the function at  $n = 1.5$ .”
5. Page 80, third line after Eq. (3.44) – The sentence should be “Four points were used to estimate the derivative so this is a fourth-order accurate finite-difference approximation.”
6. Page 89, fifth and seventh lines after Eq. (3.61) – The math symbol should be written as  $\Delta x$  instead of  $\Delta_x$ . The  $x$  should not be a subscript.
7. Page 90, Eq. (3.66) – This is subtle but the Greek letter nu in ‘ $\nu(n)$ ’ should be replaced with Arabic vee ‘ $v(n)$ ’
8. Page 90, Eq. (3.68) – The correct equation is  $\frac{g|_n - g|_{n-1}}{\Delta x} + v|_n f|_n = b_2|_n$ . Observe the correct  $n$  indices in the finite-difference approximation.

### Chapter 4

1. Page 96, sixth line below Eq. (4.6) – Equation range should be (4.2) to (4.6).

2. Page 96, ninth line below Eq. (4.6) – The sentence should read as “Furthermore,  $\varepsilon_{xx}$  will be defined at the same points as  $E_x$ ,  $\varepsilon_{yy}$  will be defined at the same points as  $E_y$ , and  $\varepsilon_{zz}$  will be defined at the same points as  $E_z$ .”
3. Page 99, fourth line from bottom – The equation number is incorrect. The sentence should read “...the right side of (4.21) is...”
4. Page 99, last line on page – There should not be a comma after the word ‘estimates.’
5. Page 99, Eq. (4.37) – The first superscript ‘e’ should not be italicized.
6. Page 102, Eqs. (4.37) to (4.48) – All  $\mu$ ’s and  $\varepsilon$ ’s in these equations should be bold and unitalicized (i.e.  $\boldsymbol{\mu}_{mn}$  and  $\boldsymbol{\varepsilon}_{mn}$ ) because they are matrices.
7. Page 109, second line from top – The text should reference Figure 4.4(a).
8. Page 109, second line after Eq. (4.88) – The text should reference Figure 4.4(b).
9. Page 110, second line after Eq. (4.90) – The text should reference Figure 4.4(b).
10. Page 111, second line after Eq. (4.91) – The sentence should read as “...column vector of magnetic field...”
11. Page 111, third line after Eq. (4.91) – The sentence should reference Eq. (4.92) instead of (4.88).
12. Page 114, first and second lines from the top – “The function  $A(x, y)$  is the complex amplitude function of the Bloch wave.  $\beta_x$  and  $\beta_y$  are the components of the Bloch wave vector. The amplitude part...” Delete the part that reads “, and  $\vec{r}$  is the position vector.”
13. Page 115, third line from bottom of page – The figure referenced should be Figure 4.4(a).
14. Page 117, second line from top of page – The figure referenced should be Figure 4.4(a).
15. Page 117, last line on page – The sentence should read “...approximation in (4.63) once for each point on the grid depicted in Figure 4.4(a).”
16. Page 118, third line from bottom of page – The equation referenced should be (4.63).
17. Page 118, second line from bottom of page – The figure referenced should be 4.4(a).
18. Page 119, Eq. (4.112) – All magnetic fields should be  $\tilde{H}_x$ . There are terms with an accidental  $z$  subscript in rows 5 and 6.
19. Page 129, first line above MATLAB code – A comma should be inserted between DEZ and DHX.
20. Page 130, line 23 in MATLAB code – The line should read “`disp( 'DEZ = ' );`”
21. Page 130, line just above last matrix – The line should read “`DEZ =`”
22. Page 137, Eq. (4.129) – Equation should be 
$$\tilde{H}_{x0} = -\frac{E_{z0}}{k_0 \mu_r \Delta y} 2j \sin\left(\frac{k'_y \Delta y}{2}\right).$$
23. Page 137, Eq. (4.130) – Equation should be 
$$\tilde{H}_{y0} = \frac{E_{z0}}{k_0 \mu_r \Delta x} 2j \sin\left(\frac{k'_x \Delta x}{2}\right).$$
24. Page 137, Eq. (4.131) – Equation should be 
$$E_{z0} = -\frac{\tilde{H}_{y0}}{k_0 \varepsilon_r \Delta x} 2j \sin\left(\frac{k'_x \Delta x}{2}\right) + \frac{\tilde{H}_{x0}}{k_0 \varepsilon_r \Delta y} 2j \sin\left(\frac{k'_y \Delta y}{2}\right).$$
25. Page 137, first line after Eq. (4.132) – the inline equation should be  $n = \sqrt{\mu_r \varepsilon_r}$ .
26. Page 138, first paragraph above Eq. (4.136) – The last sentence should be “Applying these relations to (4.135) gives”

## Chapter 5

1. Page 143, two lines above Eq. (5.3) – “When a wave is an incident from...” should read as “When a wave is incident from...” The word “an” should be deleted from the sentence.
2. Page 146, Eq. (5.16) – The middle diagonal term should be  $\frac{s_x s_z}{s_y}$ .
3. Page 152, equation for  $\epsilon_{Rxx}$  – First number should be “1.0e+02.” The number should not contain a minus sign.
4. Page 153, Eq. (5.24) – The magnetic field term should not have a  $\sim$  symbol above it. The equation should be  $[S]^{-1} \nabla \times \vec{H} = j\omega[\epsilon] \vec{E}$ .

## Chapter 6

1. Page 168, last sentence in section 6.2.2 – Sentence should end with “...has the same same term for the eigenvalue.”
2. Page 170, last sentence – Sentence should read as “...field solely in the y direction, so the...”
3. Page 175, second to last line on page – The inline MATLAB equation should be `round(rib_w/dx2)`.
4. Page 178, last sentence in paragraph after Eq. (6.67) – The sentence should be “This happens on line 129.”
5. Page 181, 7<sup>th</sup> line in second paragraph – The number of cells should be 38.71 instead of 19.35.
6. Page 183, lines 6-8 in second paragraph – Sentence read as “Be cautious because it is easy to forgot to invert  $U_{Rxx}$  or  $\epsilon_{Rxx}$  matrices when calculating B, only to get incorrect eigenmodes.”
7. Page 185, 3<sup>rd</sup> line into section 6.3.3 – Sentence should start with “Lines 117 to 145 from the original code...”
8. Page 185, last sentence in first paragraph of section 6.3.3 – Sentence should be “In this case, the second mode is chosen”
9. Page 188, 6<sup>th</sup> line in last paragraph of section 6.3.4 – Sentence should begin with “Other parameter sweeps...” The word ‘parameter’ should be singular.
10. Page 190, Lines 12 and 13 in second paragraph after Eq. (6.74) – The sentence should read as “The maximum refractive index nmax is calculated from the maximum real part of the square-root of the relative permittivities of the two mediums.”
11. Page 193, paragraph just prior to Eq. (6.75) –  $\tan\delta$  should be  $\tan \delta$ .
12. Page 193, three lines above Eq. (6.75) – Sentence should read “...in terms of their complex relative permittivity and complex relative permeability.”
13. Page 193, paragraph just after Eq. (6.75) –  $\tan\delta$  should be  $\tan \delta$ .
14. Page 193, line immediately above Eq. (6.77) – Replace “(6.37)” with “(6.40).”
15. Page 195, Eq. (6.89) should be  $\tilde{\gamma}_0^2 \cong -\text{Re}[\epsilon_{r,\text{eff}}]$ .
16. Page 195, second line after Eq. (6.89) – The sentence should read as “...complex propagation constant  $\tilde{\gamma}$  is calculated...” The eigenvalue should have a tilde.
17. Page 196, first line – Sentence should read “...lines 178 to 230...”

18. Page 196, Figure 6.22, caption (a) – Caption (a) should read as “Line integral to calculate potential difference  $V_0$ .”
19. Page 197, Table 6.1, value for  $L$  – Value for  $L$  should be 303 nH/m.
20. Page 197, Table 6.1, value for  $G$  – Value for  $G$  should be 19.2 mS/m.
21. Page 202, Eqs. (7.9) and (7.10) – The ‘e’ superscripts on the derivative matrices should not be italicized. The equations should be  $\mathbf{D}_y^e \mathbf{e}_z = k_0 \mu_{xx} \tilde{\mathbf{h}}_x$  and  $-\mathbf{D}_x^e \mathbf{e}_z = k_0 \mu_{yy} \tilde{\mathbf{h}}_y$ .
22. Page 211, first line in fourth paragraph – Sentence should read “...lines 97 to 129...”
23. Page 211, fifth line in fourth paragraph – Sentence should read “...lines 111 to 118...”
24. Page 211, third to last line in fourth paragraph – Sentence should read “...lines 120 to 127...”
25. Page 212, third sentence in top paragraph – Sentence should read “...lines 131 to 146...”

## Chapter 7

No errors identified.

## Chapter 8

1. Page 221, line immediately above Eq. (8.39) – Sentence should begin as “Rotating meshgrids was...”
2. Page 229, Figure 8.5 – Second block in the section labeled “Perform FDFD” should read “Build Derivative Matrices.”
3. Page 230, 5<sup>th</sup> line from the top – Sentence should read as “...determine the physical size of...”
4. Page 232, third line – The inline equation should be  $R = 5.9 \times 10^{-5}$ . The  $\times$  symbol is missing.
5. Page 241, second to last line in first paragraph – Sentence should read “...to form a rectangle around...”
6. Page 243, eighth line from bottom – Sentence should read “Lines 98 and 99...”
7. Page 248, third line from bottom – Sentence should read “Last, lines 32 to 36...”
8. Page 250, first sentence in second paragraph – Sentence should read “...lines 177 to 212...”

## Chapter 9

1. Page 255, first paragraph – wavelength range should be  $1.4 \mu\text{m} \leq \lambda_0 \leq 1.6 \mu\text{m}$ .
2. Page 257, First line above Figure 9.2 – wavelength range should be  $1.4 \mu\text{m} \leq \lambda_0 \leq 1.6 \mu\text{m}$ .
3. Page 260, line 14 in second paragraph in section 9.2.2 – “duty cycle” should be replaced with “fill factor.”
4. Page 264, last line in 3<sup>rd</sup> paragraph – “z-direction” should be replaced with “y direction.”
5. Page 265, third line in second paragraph – The sentence should read “...is calculated on lines 143 and 144 and...”
6. Page 265, Reference [2] – The complete reference is:  
Magnusson, R., and Ko, Y. H., "Guided-mode resonance nanophotonics: fundamentals

and applications." *Nanoengineering: fabrication, properties, optics, and devices XIII*. Vol. 9927. SPIE, 2016.

## Chapter 10

7. Page 271, Equation (10.14) – The left side of the equation should be  $\mu_{xy}|_{i,j,k} \tilde{H}_y|_{i,j,k}$ .
8. Page 271, Equation (10.15) – The left side of the equation should be  $\mu_{xz}|_{i,j,k} \tilde{H}_z|_{i,j,k}$ .
9. Page 277, Equation (10.49) – The equation should be  $(\mathbf{C}^e[\boldsymbol{\zeta}]\mathbf{C}^h - [\boldsymbol{\mu}]) \vec{\mathbf{h}} = \mathbf{0}$ .
10. Page 286, second sentence in second paragraph – Sentence should read "...from lines 2 to 44 and..."
11. Page 286, line 11 from the top – Sentence starting with "Line 48..." should be "Line 51..."
12. Page 286, fourth line up from bottom of page – The end of the sentence should read "...from lines 194 to 200 using (10.38)..."
13. Page 287, third line above Section 10.5.3 – Sentence should read "Lines 303 and 304 calculate..."
14. Page 290, Figure 10.5(a) – Vertical axis should be labeled with  $z$ .
15. Page 294, third to last line in second paragraph – Sentence should read "Line 198 calculates..."
16. Page 295, third sentence below Fig. 10.10 – Nicolson-Ross-Weir should be italicized because an acronym is being defined.
17. Page 296, second line above Eq. (10.78) – The inline equation should be  $\ln(t) = j(k_0 n_{\text{eff}} a \pm 2\pi m)$ .
18. Page 296, first line after Eq. (10.79) – The inline equation for the effective refractive index should be  $n_{\text{eff}} = \sqrt{\mu_{r,\text{eff}} \epsilon_{r,\text{eff}}}$ .
19. Page 297, fifth line from bottom – Sentence should read "Lines 148 to 151 remove..."
20. Page 298, sixth line in second paragraph – Sentence should read "...from lines 284 to 347."
21. Page 298, last line in second paragraph – Sentence should read "Lines 284 to 347 plot..."
22. Page 299, Figure 10.11 – Labels (a), (b), (c), (d), (e) and (f) are missing from the figure. The subplots should be labeled left-to-right and then top-to-bottom.
23. Page 301, first line in third paragraph – Sentence should read "...from lines 60 to 141."
24. Page 301, fourth line in third paragraph – Sentence should read "Lines 75 to 106 are..."
25. Page 304, Reference [38] – The title should be "Electromagnetic Design with Transformation Optics."

## Back Matter

1. Page 315, last line in first paragraph – The website is <https://raymondbrumpf.com/>.