Electromagetic Waves and Antennas – S. J. Orfanidis
Errata List – May 16, 2018

The page numbers refer to the online version of the book posted on the web page:
`http://www.ece.rutgers.edu/~orfanidi/ewa/`

p.368. Eq. (9.1.24) should read,

$$\boxed{\begin{aligned} E_\rho &= -\frac{j\beta}{k_c^2}\left(\partial_\rho E_z + \eta_{\text{TE}}\frac{1}{\rho}\partial_\phi H_z\right) \\ E_\phi &= -\frac{j\beta}{k_c^2}\left(\frac{1}{\rho}\partial_\phi E_z - \eta_{\text{TE}}\partial_\rho H_z\right) \end{aligned}}\quad,\quad \boxed{\begin{aligned} H_\rho &= -\frac{j\beta}{k_c^2}\left(\partial_\rho H_z - \frac{1}{\eta_{\text{TM}}\rho}\partial_\phi E_z\right) \\ H_\phi &= -\frac{j\beta}{k_c^2}\left(\frac{1}{\rho}\partial_\phi H_z + \frac{1}{\eta_{\text{TM}}}\partial_\rho E_z\right) \end{aligned}}$$

p.377. In line 4 below Eq. (9.5.8), instead of $\sin k_x$, read, $\sin k_x x$. And, in the last equation below Eq. (9.5.9), the expression for H_2 should be corrected to read,

$$H_2 = \frac{1}{\eta_{\text{TM}}}E_1 = -\frac{j\omega k_x}{\omega_c k_c}\frac{1}{\eta}E_0$$

p.396. In Eq. (9.11.37), instead of $\sin\theta_c^2$, read, $\sin^2\theta_c$.

p.600. Replace ζ^{-2} by ζ_-^{-2} in the denominator of the second term of the first equation in Eq. (12.2.1).

p.606. Eq. (12.4.6) should read,

$$\begin{bmatrix} a_1(z) \\ a_2(z) \end{bmatrix} = e^{-j\beta z}\begin{bmatrix} \cos\sigma z - j\,\dfrac{\delta}{\sigma}\sin\sigma z & -j\,\dfrac{\kappa}{\sigma}\sin\sigma z \\ -j\,\dfrac{\kappa}{\sigma}\sin\sigma z & \cos\sigma z + j\,\dfrac{\delta}{\sigma}\sin\sigma z \end{bmatrix}\begin{bmatrix} a_1(0) \\ a_2(0) \end{bmatrix}$$

p.609. The factor U_{12} in the numerator of Eq. (12.5.12) should be conjugated, U_{12}^*.

p.650. In the penultimate paragraph of Example 13.11.1, $X_2 = 1/j\omega C$ and $X_1 = j\omega L$, should be replaced by, $X_2 = -1/\omega C$ and $X_1 = \omega L$.

And in the last pargraph, $X_2 = j\omega L$ and $X_1 = 1/j\omega C$, should be replaced by, $X_2 = \omega L$ and $X_1 = -1/\omega C$.

p.670. In Eq. (14.4.5), the expression, $S_{22}a_1 + S_{22}\Gamma_L b_2$, should read, $S_{21}a_1 + S_{22}\Gamma_L b_2$.

p.673. The first line of the equation below Eq. (14.5.9) should read,

$$1 - |\Gamma_{\text{in}}|^2 = 1 - \left|\frac{S_{11} - \Delta\Gamma_L}{1 - S_{22}\Gamma_L}\right|^2 = \frac{|1 - S_{22}\Gamma_L|^2 - |S_{11} - \Delta\Gamma_L|^2}{|1 - S_{22}\Gamma_L|^2}$$

p.694. In Example 14.10.1, the numerical values of Z_G and Z_L should be interchanged, that is,

$$Z_L = 69.21 + 14.42j\ \Omega, \quad Z_G = 23.15 - 24.02j\ \Omega$$

p.698. In second paragraph from the top, instead of "corresponding matched load", read, "corresponding matched generator".

p.704. The two-line MATLAB code above Fig. 14.12.2 should read,

```
gG = smatch(S);
F = nfig(Fmin, rn, gGopt, gG);
```

p.723. In lines 3 & 4 below Eq. (15.6.2), the term, $k_x\hat{\mathbf{z}}$, should be changed to, $k_x\hat{\mathbf{x}}$.

p.755. After Eq. (16.7.1), the Boltzmann constant should read, $k = 1.3806 \times 10^{-23}$ W/Hz K.

p.765. In the last line of Example 16.8.3, the calculated value of G/T should be, 24.2082 dB.

p.782. In line 3 from the top, instead of "Appendix F", read, "Appendix G".

p.1021. In the text line before Eq (20.22.13), instead of, $\lambda_0 \le \lambda_1 \le \cdots \le \lambda_M$, read, $\lambda_0 \ge \lambda_1 \ge \cdots \ge \lambda_M$.

p.1049. In line 1 below Eq. (21.3.3), instead of, $F_1(\nu, s)$, read, $F_1(\nu, \sigma)$.

p.1050. Inside the integral of the equation preceding Eq. (21.3.5), instead of, $e^{j\pi\nu\xi}$, read, $e^{j\pi\nu_x\xi}$.

p.1051. In Eq. (21.3.15), instead of, $f_0(\nu_y, \sigma_a)$, read, $f_0(\nu_y, \sigma_b)$.

p.1062. In the second equation of Eq. (21.6.5), instead of, $\pm$, read, $\mp$. And, in the equation below the fourth text paragraph, instead of, $\boldsymbol{F}_{m,24} = \hat{\mathbf{x}} \cdots$, read, $\boldsymbol{F}_{m,24} = -\hat{\mathbf{x}} \cdots$. Moreover, in Eq. (21.6.7), instead of $\boldsymbol{F}_{m,12}$, read, $\boldsymbol{F}_{m,13}$.

p.1071. In last line of third paragraph of Section 21.9, instead of, $\hat{\mathbf{x}}' = -\hat{\mathbf{z}}$, read, $\hat{\mathbf{z}}' = -\hat{\mathbf{z}}$.

p.1100. Line 2 of Sec. 22.4, instead of "see Fig. 22.3.4", read, "see Fig. 22.1.1".

p.1143. The first line of the MATLAB code at the bottom of the page should be,
`[a, dph] = binomial(0.5, 90, 7);`

p.1148. Example 23.9.1 shows the case of a 5-element array. The 7-element case corresponds to the following changes in the code, table, and weights,

```
[a, dph] = dolph(0.5, 90, 7, 20);
```

i	x_i	ψ_i	z_i
1	0.9659	1.0826	$0.4691 + 0.8832j$
2	0.7071	1.7852	$-0.2127 + 0.9771j$
3	0.2588	2.6782	$-0.8945 + 0.4470j$
4	−0.2588	3.6050	$-0.8945 - 0.4470j$
5	−0.7071	4.4980	$-0.2127 - 0.9771j$
6	−0.9659	5.2006	$0.4691 - 0.8832j$

$$x_0 = 1.1270\,, \quad \mathbf{w} = [1,\ 1.2764,\ 1.6837,\ 1.8387,\ 1.6837,\ 1.2764,\ 1]$$

In penultimate line of Example 23.9.2, instead of $R = 20$, read, $R = 25$.

p.1149. Line 4 below the table, instead of $kd < \pi/2$, read, $kd < \pi$.

p.1158. Line 6 above Eq. (23.10.10), instead of $y = \sinh(x)x$, read, $y = \sinh(x)/x$.
Line 2 above Eq. (23.10.11), instead of "is ψ-space", read, "in ψ-space".

p.1168. and p.1169, the MATLAB function, `multbeam`, should be, `multibeam`.

p.1197. Line 5 from bottom, "Then, Eq. (24.9.3)", shoud read, "Then, Eq. (24.8.9)".

p.1210. In the bottom integral of Eq. (24.12.15), instead of dy, read dz.

p.1237. Line 2, instead of, Appendix F, read, Appendix G.

Line 4, instead of, range $[-h_1, h_1]$, read, range $[-h_2, h_2]$.

Upper limit of the integral in Eq. (25.3.14) should be h_2 instead of h_1.

In the equation below Eq. (25.3.14), u_1 should read,

$$u_1 = k\left[\sqrt{d^2 + (h_2 - z_0)^2} + s(h_2 - z_0)\right]$$

Eq. (25.3.16) should be read,

$$\int_{-h_2}^{h_2} F(z)\,dz = \sum_{i=1}^{12} c_i\, G(z_i, s_i)$$

and the table below it should read,

i	z_i	s_i	c_i	i	z_i	s_i	c_i
1	$h_1 - b$	1	c_1	7	$h_1 - b$	-1	c_1^*
2	$-h_1 + b$	1	c_1	8	$-h_1 + b$	-1	c_1^*
3	$-h_1 - b$	1	c_1	9	$-h_1 - b$	-1	c_1^*
4	$h_1 + b$	1	c_1	10	$h_1 + b$	-1	c_1^*
5	b	1	$-2c_1 \cos kh_1$	11	b	-1	$-2c_1^* \cos kh_1$
6	$-b$	1	$-2c_1 \cos kh_1$	12	$-b$	-1	$-2c_1^* \cos kh_1$

The function **imped2.m** contained in **ewa.zip** has been updated accordingly.

p.1244. In the three equations between Eq. (25.5.8) and (25.5.9), $\cos(kh_p \cos\theta))$, should read, $\cos(kh_p \cos\theta)$.

p.1273. Eq. (D.6) in Appendix D should read,

$$\boldsymbol{\nabla} \times \boldsymbol{\nabla} \times [\mathbf{p}\, G(\boldsymbol{r})] = \frac{2}{3}\mathbf{p}\,\delta^{(3)}(\boldsymbol{r}) + \left[\left(jk + \frac{1}{r}\right)\frac{3\hat{\mathbf{r}}(\hat{\mathbf{r}}\cdot\mathbf{p}) - \mathbf{p}}{r} + k^2\,\hat{\mathbf{r}} \times (\mathbf{p} \times \hat{\mathbf{r}})\right] G(\boldsymbol{r})$$

p.1285. In Eq. (F.28) of Appendix F, the quantity $I(\phi, k\rho)$ should be replaced by $I(\phi)$.