ERRATA for Digital Color Imaging Handbook, Gaurav Sharma, Ed., CRC Press, 2003

Errata for first printing Dec 23, 2002:

1. Page 8, Eqn. (1.2) and the beginning of the following sentence should read:

$$c_i = \sum_{j=0}^{N-1} s_i(\lambda_j) f(\lambda_j) \Delta\lambda = \mathbf{s}_i^T \mathbf{f} \quad i = 1, 2, 3; \tag{1}$$

   where $\{\lambda_j\}_{j=0}^{N-1}$ are the uniformly spaced wavelengths ...

2. Page 9, first line change $\mathbf{S} = [s_2, s_2, s_3]$ to read $\mathbf{S} = [\mathbf{s}_1, \mathbf{s}_2, \mathbf{s}_3]$.

3. Page 9, fourth line from the bottom. Change "and $\mathbf{S}^T\mathbf{p}_2$" to "and $\mathbf{S}^T\mathbf{p}_3$".

4. Page 12, the definition of the color matching matrix, while correct, can probably benefit from some clarification. The text after Eqn. (1.7) should read:
   "where $\mathbf{I}_N = [\mathbf{e}_1, \mathbf{e}_2, ..., \mathbf{e}_N]$ is the $N \times N$ identity matrix, and $\mathbf{A} = [\mathbf{a}_1, \mathbf{a}_2, ..., \mathbf{a}_N]^T$ is the $N \times 3$ *color-matching matrix* corresponding to the primaries $\mathbf{P}$ [1]. The N entries, $\{a_{ik}\}_{i=1}^N$ in the kth column of the $N \times 3$ matrix $\mathbf{A}$ correspond to the relative amount of the kth primary required to match $\{\mathbf{e}_i\}_{i=1}^N$, respectively. For instance, the first column $\{a_{11}, a_{21}, \ldots a_{N1}\}$ corresponds to the relative amounts of the first primary needed to match $\{\mathbf{e}_i\}_{i=1}^N$. The columns of $\mathbf{A}$ are therefore referred to as the *color-matching functions* (CMFs) (associated with the primaries $\mathbf{P}$)."

5. Page 24, Equation (1.18), in all denominators replace Z' by Z.

6. Page 25, line before (1.20) should be "Pre-multiplying both sides ...". instead of "Post-multiplying both sides ...".

7. Page 30, last line before section 1.7.2, change $\arctan(\frac{u^*}{v^*})$ to $\arctan(\frac{v^*}{u^*})$.

8. Page 31, Eqn. 1.41, should read
$$h_{ab}^* = \arctan(\frac{b^*}{a^*})$$

9. Page 33, replace $\arctan(\frac{a^*}{b^*})$ with $\arctan(\frac{b^*}{a^*})$.

10. Page 35, the second line in the equation for H^* has a typo. The equation should be

$$\begin{aligned} \Delta H^* &= \sqrt{(\Delta E_{ab}^*)^2 - ((\Delta L^*)^2 + (\Delta C^*)^2)} \\ &= \sqrt{(\Delta a^*)^2 + (\Delta b^*)^2 - (\Delta C^*)^2} \\ &= \frac{2(a_2^* b_s^* - a_s^* b_2^*)}{\sqrt{C_{ab,2}^* C_{ab,s}^* + a_2^* a_s^* + b_2^* b_s^*}} \end{aligned} \tag{2}$$

11. Page 40, Figure 1.18 is incorrect the updated version of the figure should be the version shown below in Fig. C.1.

    The error resulted from an incorrect implementation of the formula. The reader is also referred to [1] for additional information learned since the publication of the book.

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[1] In defining $\mathbf{A}$ as the matrix whose i^{th} row is $\mathbf{a_i}^T$, we breach the common convention used throughout the rest of the chapter according to which a bold lower case subscripted letter denotes a column of the matrix denoted by the corresponding bold upper case letter.
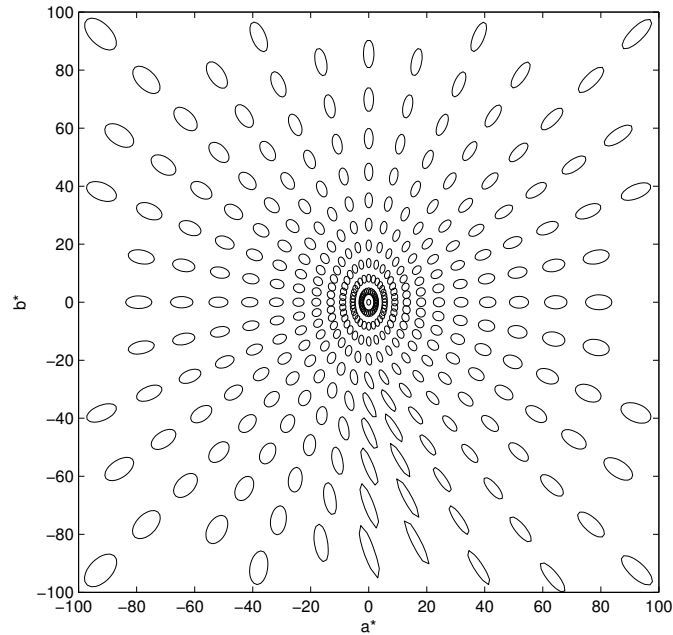
Figure C.1: "Ellipses" corresponding to a CIEDE2000 color difference of $\Delta E_{00} = 1.0$ in the a^*-b^* plane.

12. Page 48, Equation (1.57) has a couple of typos in the last line (sign changes). This should be corrected to

$$
\begin{aligned}
O_1 &= 0.279X + 0.72Y - 0.107Z \\
O_2 &= -0.449X + 0.29Y - 0.077Z \\
O_3 &= 0.086X - 0.59Y + 0.501Z
\end{aligned}
$$

13. Page 50, Figure 1.21 caption replace "S-CEILAB" with "S-CIELAB".

14. Page 72, the title of section 1.11.3 should be "Computer Generated Imagery".

15. Page 79, Section 1.11.4.4 title should be "Digital color cameras ..." instead of "Digital dolor cameras ...".

16. On page 119, Section 2.2.3 has a incorrect reference to a hue circle in Fig. 2.1 . Fig 2.1 is actually a graph of a psychometric function (referred to on page 131). The reference should be dropped by deleting the phrase ", as shown in Figure 2.1" at the end of the first sentence in the 8th line from the bottom on this page.

17. In Chapter 2, p. 119, change the 5th line from the bottom to read "first postulated by Hering[6]." instead of "first postulated by Hering in 1920[6]".

    (The theory was first proposed in the 1870's but the publication dates from 1920.)

18. Page 296, add a transpose to the expression for the matrix, i.e., $\mathbf{C} = [\mathbf{c}_1, \ldots \mathbf{c}_T]^T$.

19. Page 302, sixth line from the bottom should read: "without loss of generality" instead of "without less of generality".

20. Page 337, 9th line from the bottom replace "can exploited" by "can be exploited".

21. Page 339, Equation (5.60), should not have the factor w on the right hand side, the correct equation should read $A(\lambda) = \xi k(\lambda)$.

22. Page 343, Equation (5.76), the $s_i(\lambda)$ in the denominator should be $s_p(\lambda)$, i.e., the correct equation should read

$$\frac{K(\lambda)}{S(\lambda)} = \frac{k_p(\lambda)}{s_p(\lambda)} + \sum_{i=C,M,Y} \frac{k_i(\lambda)}{s_p(\lambda)} \tag{3}$$

23. Page 467, Figure 6.56, the last diamond shaped block should read $i_c < i_m$ (i.e. "greater than" sign should be replaced with the "less than" sign).

24. Pages 692-695, the discussion of two dimensional interpolation geometries has some inconsistencies in the equations with respect to the figures. In figure 11.3, the labels for nodes n_{10} and n_{01} in the figure should be swapped. With this altered labeling the equation on page 93 just following "u first" should be

$$p_0' = p_{00} + u(p_{10} - p_{00})$$

Similarly in Figure 11.4, the node labeled n_{01} should actually be labeled n_{10} (to be consistent with Fig. 11.3). Once this change is done. The corresponding equations on page 694 should be corrected as,

$$\begin{aligned} p_0 &= p_{00} + t(p_{01} - p_{00}) \equiv p_{00} + t(p_{11} - p_{10}) \\ p_1 &= p_{10} + t(p_{11} - p_{10}) \\ p &= p_0 + u(p_1 - p_0) = p_{00} + t(p_{11} - p_{10}) + u\left(p_{10} + t(p_{11} - p_{10}) - [p_{00} + t(p_{11} - p_{10})]\right) \\ &= p_{00} + t(p_{11} - p_{10}) + u(p_{10} - p_{00}) \end{aligned}$$

Note that the values p_0 and p_1 correspond to the values for the nodes labeled n_0 and n_1 in Fig. 11.3 and the above process illustrates how the final expression for triangular interpolation equation is obtained from bilinear interpolation under the assumption of zero cross derivatives.

25. Page 701, Figure 11.10 caption should be "Special case of tetrahedral interpolation where $t < u$, $t > v$".

26. Page 701, Table 11.2. The last two rows in the last two columns (corresponding to s_u and s_v) should be switched. The corrected table should therefore be as follows:

Case			s_t	s_u	s_v
$t < u$	$t > v$		Δ_1	Δ_5	Δ_2
$t < u$	$t \leq v$	$u < v$	Δ_9	Δ_8	Δ_4
$t < u$	$t \leq v$	$u \geq v$	Δ_9	Δ_5	Δ_{11}
$t \geq u$	$t < v$		Δ_3	Δ_7	Δ_4
$t \geq u$	$t \geq v$	$u < v$	Δ_{10}	Δ_7	Δ_{12}
$t \geq u$	$t \geq v$	$u \geq v$	Δ_{10}	Δ_6	Δ_2

Table 1: Tetrahedral Interpolation: The Various Tests and Corresponding Interpolation Weights

Thanks to alert readers and contributors for pointing out these errors. Several of the errors in mathematical notation seem to have arisen in the final type-setting process and were not present in the author manuscripts. If you find any additional errors, please email me at g.sharmaieee.org. For the most up-to-date version of this errata, please check the CRC Press website or the editor's web-page.

References

[1] G. Sharma, W. Wu, and E. N. Dalal, "The CIEDE2000 color-difference formula: Implementation notes, supplementary test data, and mathematical observations," *Color Res. Appl.*, vol. 30, no. 1, pp. 21–30, Feb. 2005.