

Fundamentals of Electrical Engineering, 1st Edition.

Giorgio Rizzoni

Errata Corrige for first printing of 1st Edition

Revision 1

August 31st, 2008

Note from the Author

Dear students or instructors:

First, thank you for using this book. This document contains a list of typographical errors, misprints and the occasional technical error. I am grateful to Dr. Ralph Tanner of Western Michigan University for uncovering the majority of these errata, and I include a note prepared by him because I especially liked his suggestion directed at the students.

I would be grateful if any user who thinks that they might have uncovered an error would be kind enough to send a message with a detailed description of the suggested correction to me at rizzoni.1@osu.edu.

Again, thank you for adopting this textbook.

Giorgio Rizzoni, Columbus, august 2008

Note by Dr. Ralph Tanner, Western Michigan University

There are a dozen pages of errata contained here. At first blush, this might be considered excessive. However, the errors are generally minor and are of the type that the knowledgeable reader would tend to “self-correct” when reading the material.

But, since this is a text intended for the student, these errors can cause self-doubt and can get in the way of learning the material. The student may tend to believe that the error is in their understanding rather than in the printing of the book. For this reason, this errata file has been very picky.

I would recommend that the student adopt one of two strategies with this errata file:

- 1) Go through the entire errata file and mark the changes in the book.
- 2) Go through the entire errata file and put a prominent red dot on each page where an erratum occurs.

I believe the first strategy is the best. This allows the student to have the correct information at the point when it is needed. However, the second strategy will alert the student to a possible point of confusion. If a topic on the page in question causes confusion, the student can make the change at that time. If the topic causing confusion was in error, the student will have the corrected material. If the topic causing confusion was not the one in error, the student will know to keep working to understand the area of confusion.

What I do NOT recommend is the filing of the errata then going to it only when confusion arises.

In my classes, I teach the analysis of circuits. I also teach the engineering methods used to reduce the chance of errors. Engineering is a field where errors may cause the loss of life. (Another is medicine.) Because of this grave responsibility, we need to learn how to minimize errors. One of the methods used to minimize errors is multiple cumulative review. This errata file represents the start of this process. I am certain that I have not found all of the errors in this text.

Chapter 1

No errata.

Chapter 2 – Fundamentals of Electric Circuits

p. 29: The last sentence of the first paragraph should read:

An example of this dual behavior is exhibited by the photodiode, which can act either in a passive mode (as a light sensor) or in an active mode (as a solar cell).

p. 44: CHECK YOUR UNDERSTANDING: The first sentence should read:

Compute the full-scale (i.e., largest) output voltage for the force-measuring apparatus of Example 2.16.”

p. 77: Figure 3.18:

v_l in the figure for analysis for mesh 2 does not enter into the analysis for mesh 2 so it should not be on that figure (delete “+ v_l –”)

Chapter 3 – Resistive Network Analysis

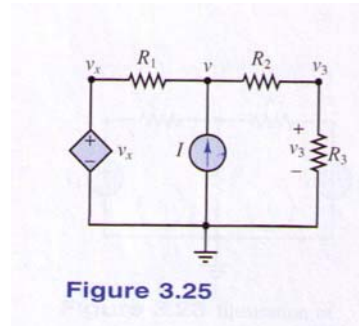
p. 81: Example 3.10/Solution, *Analysis*:

“We follow the Focus on Measurement ...” should read “We follow the Focus on Methodology ...”

p. 83: on the second line:

“(transistors are introduced in Chapter 9)” should read “(transistors are introduced in Chapter 10)”

p. 84: Figure 3.25 should be replaced by the one shown below.



p. 84: a subscript is missing.

CHECK YOUR UNDERSTANDING: Answer should be $v = \frac{21}{11}$ V; $v_3 = \frac{14}{11}$ V

p.119: Figure P3.20:

The resistor with the missing value should have a value of 4Ω .

Chapter 4 – AC Network Analysis

p. 133: Example 4.1, Solution

Find: Charge separation at nominal voltage ...” should read, “**Find:** Charge stored at nominal voltage”

p. 133: Example 4.1, Solution

The line that reads, “Since we know that the discharge current is 25 A and the available charge separation is 250 F ...” should read, “Since we know that the discharge current is 25 A and the available charge separation is 250 C”

p. 134: CHECK YOUR UNDERSTANDING:

Should read, “Compare the charge storage achieved in this ultracapacitor with a (similarly sized) electrolytic capacitor used in power electronics applications, by calculating the charge storage for a 2,000 μF electrolytic capacitor rated at 400 V.”

p. 138: CHECK YOUR UNDERSTANDING:

Should read, “Compare the energy stored in this ultracapacitor with a (similarly sized) electrolytic capacitor used in power electronics applications, by calculating the energy stored in a 2,000 μF electrolytic capacitor rated at 400 V.”

p. 146: Under “Why Sinusoids?”:

“... regarding the analysis of electric power circuits. Note that the methods ...”

should read,

“... regarding the analysis of electric power circuits. The more ambitious reader may wish to explore **Fourier Analysis** on the web to obtain a more comprehensive explanation of the importance of sinusoidal signals. Note that the methods”

p. 148: Equation (4.27) should read:

$$W = TP_{AV} = T \langle p(t) \rangle = \int_0^T p(t') dt' = \int_0^T Ri_{ac}^2(t') dt' = TI_{eff}^2 R$$

p. 149: Equation (4.28) should read:

$$I_{eff} = \sqrt{\frac{1}{T} \int_0^T i_{ac}^2(t') dt'} = I_{rms}$$

Chapter 5 – Transient Analysis

p. 182: last line on the page

“By analogy with equation 5.8, we call ...”

should read

“By analogy with equation 5.7, we call ...”

p. 184: Section 5.3, last line of introductory paragraph

“using the principle of continuity of inductor voltage and current”

should read

“using the principle of continuity of capacitor voltage and inductor current.”

p. 191: FOCUS ON METHODOLOGY: Step 2:

$v_C = v_C(0^-)$ should read $v_C(0^+) = v_C(0^-)$

p. 195: Example 5.7, Solution, Step 4:

“... with reference to equation 5.22”

should read

“... with reference to equation 5.24.”

p. 197: Figure 5.19:

The vertical scale on the graph should be labeled “Ratio of capacitor voltage to source voltage (v_C/V_B)” and the horizontal scale should be labeled “Time constants (RC)”

p. 197: Figure 5.20:

The direction of i_L should be counter-clockwise. The vertical scale on the graph should be labeled “Ratio of Inductor current to source current (i_L/I_B)” and the horizontal scale should be labeled “Time constants, L/R)”

p. 202: two paragraphs above the beginning of **Example 5.10**

“... with reference to equation 5.25 ...”

should read

“... with reference to equation 5.24 ...”

p. 204: Example 5.10, Solution, Step 2:

“(equation 5.25)” should read “(equation 5.22)”

p. 204: Example 5.10, Solution, Step 4:

“... with reference to equation 5.22 ...” should read “... with reference to equation 5.24 ...”

p. 210: below Equation 5.49:

“in equation 5.48 ...” should read “in equation 5.49 ...”

p. 211: five lines under Figure 5.39:

“in the differential equation 5.48 ...” should read “in the differential equation 5.49 ...”

p. 214: Example 5.13, Solution, Analysis:

“This equation is in the form of equation 5.50, with $K_S = 1$, $\omega_n^2 = 1/LC$...”

should read

“This equation is in the form of equation 5.50, with $\omega_n^2 = 1/LC$ ”

p. 214: Example 5.13, Solution, Analysis:

“... by inspection that $K_S = 1$, $\omega_n = 1/\sqrt{LC}$ ”

should read

“... by inspection that $\omega_n = 1/\sqrt{LC}$ ”

p. 214: Example 5.13, Solution, Analysis:

“... we have $s_{1,2} = -12.5 \pm j316.2$ ”

should read

“... we have $s_{1,2} = -12.6 \pm j316.0$...”

The second line of the equation immediately below this should then be:

$$= \alpha_1 e^{(-12.6 + j316.0)t} + \alpha_2 e^{(-12.6 - j316.0)t}$$

p. 216: Five lines below Equation 5.59

“... the exponential decay term $2\alpha_1 e^{-\zeta\omega_n t}$ ”

should read

“... the exponential decay $2\alpha_1 e^{-\zeta\omega_n t}$ ”

p. 218: FOCUS ON METHODOLOGY: Step 2:

“... $i_L(0^+) = i + L(0^-)$...”

should read

“... $i_L(0^+) = i_L(0^-)$...”

p. 218: FOCUS ON METHODOLOGY: Step 3:

“(equation 5.9 or 5.49)”

should read

“(equation 5.13 or 5.49)”

p. 219: Step 2:

“... continuity of inductor voltage and capacitor currents ...”

should read

“... continuity of inductor current and capacitor voltage ...”

p. 221: Example 5.15, Solution, *Find*:

“... the differential equation in $i_L(t)$ describing ...”

should read

“... the differential equation in $v_C(t)$ describing ...”

p.221: Example 5.15, Solution, *Schematics* ...:

“ $R = 500 \Omega$ ”

should read

“ $R = R_S = 1,000 \Omega$ ”

p. 222: Example 5.15, Solution, Step 2:

“... continuity of inductor voltage and capacitor currents ...”

should read

“... continuity of inductor current and capacitor voltage ...”

p. 224: Example 5.16, Solution, Step 2:

“... continuity of inductor voltage and capacitor currents ...”

should read

“... continuity of inductor current and capacitor voltage ...”

p. 229: The text neglects to divide the voltage drop across the resistor by the inductance. This causes errors in α_1 and α_2 at the bottom of the page and in the voltage across the spark plug on the following page. The student should trace through these errors to obtain the correct solution (-819.2 V). Note that there is also one additional sign error in the final computation by the text of the initial voltage across the spark plug.

I have not finished correcting this last error. I will have to re-type several equations and re-calculate a lot of things.

Chapter 6 – Frequency Response and System Concepts

p. 254: The equation at the bottom of the page is missing the equal sign between $H(j\omega)$ and the fraction.

p. 255:

“... around the frequency of 300 rad/s, the magnitude ...”

should read

“... around the frequency of 800 rad/s, the magnitude ...”

Chapter 7 AC Power

p. 280: three lines below Equation 7.1

“... with phase angle $\theta_V = \pi/6$ and ...”

should read

“... with phase angle $\theta_V = 0$ and ...”

p. 290: The equation at the bottom of the page:

“ $86.6 + j50 \text{ W}$ ”

should read

“ $86.6 + j50 \text{ VA}$ ”

p. 291: The equation at the bottom of the page:

“ $1,192 - j316 \text{ W}$ ”

should read

“ $1,192 - j316 \text{ VA}$ ”

p. 293: Example 7.6, Solution, Analysis, part 1

The equation that reads “ $503 + j839 \text{ W}$ ”

should read

“ $503 + j839 \text{ VA}$ ”

p. 297: The equation at the bottom of the page:

“ $68.4 + j118.6 \text{ W}$ ”

should read

“ $68.4 + j118.6 \text{ VA}$ ”

p. 302: Example 7.1 Solution, Analysis, middle of the page

“where we have selected the positive value of arccos (pf_1) because pf_1 is lagging and the negative value of arccos (pf_2) ...”

should read

“where we have selected the negative value of arccos (pf_1) because pf_1 is lagging and the positive value of arccos (pf_2) ...”

p. 302: **Example 7.1 Solution, Analysis**, seven lines above the last equation on the page

“where, once again ...”

should read

“where, now ...”

p. 303: **Section 7.3**, introductory paragraph, last line.

“discussed in Chapter 14.”

should read

“discussed in Chapter 13.”

p. 304: seven lines below equation 7.32

“... as explained in Chapter 14.”

should read

“as explained in Chapter 13.”

p. 306: The equation at the end of the example that reads:

$$\tilde{I}_{primary} = \frac{7,500 \text{ W}}{4,800 \text{ A}} = 1.5625 \text{ A}$$

should read:

$$????\tilde{I}_{primary} = \frac{7,500 \text{ W}}{4,800 \text{ V}} = 1.5625 \text{ A}$$

p. 306: CHECK YOUR UNDERSTANDING:

The answer should be: $n_1 = 6,000$

p. 313: **Section 7.4**, second line of second paragraph.

“... as will be explained in Chapter 15 ...”

should read

“... as explained in Chapter 14 ...”

p. 316: CHECK YOUR UNDERSTANDING:

The second answer should be: ?? $S_L = 69.12 \text{ kW} + j207.4 \text{ kVA}$

p. 318: Equation 7.64: $(\tilde{I}_{an})_y$ should be $(\tilde{I}_a)_y$

p. 326: Conclusion 2:

“... (that for which the user is charged) ...”

should be changed to

“... (that which does work for the user) ...”

A sentence should be added after this sentence which would read, “However, the user is charged for all of the power supplied by the utility company, both real and reactive.

p. 326: Conclusion 2:

“... and it can be minimized by ...”

should be replaced by

“... and the reactive power can minimized by ...”

Chapter 8 – Operational Amplifiers

p. 356: five lines above Figure 8.14

“... which is discussed in Section 8.6.”

should read

“... which is discussed in Section 8.5.”

p. 361: third line from the top

“The second amplifier, and inverting ...”

should read

“The second amplifier, an inverting ...”

p. 362: twelve lines below Figure 8.18

“... ranging from 1 to 50 ...”

should read

“... ranging from 1 to 10 ...”

p. 363: Practical Op-Amp Design Considerations box, 1.

“(see Table 2.1)”

should read

“(see Table 2.2)”

p. 363: Practical Op-Amp Design Considerations box, 1.

“... inspection of Table 2.1 reveals ...”

should read

“... inspection of Table 2.2 reveals ...”

p. 363: Practical Op-Amp Design Considerations box, 2.

“... as explained in Section 8.6.”

should read

“... as explained in Section 8.5.”

p. 367: line immediately above Figure 8.22

“... filter response for frequencies is significantly higher ...”

should read

“... filter response for frequencies significantly higher ...”

p. 370: The last equation on the page which begins

$$“= R_1 + j\omega L = R_1 \left(1 + j\omega \frac{L}{R_1} \right) = R_1 \left(1 + j \frac{\omega}{\omega_0} \right)”$$

should read

$$“Z_S = R_1 + j\omega L = R_1 \left(1 + j\omega \frac{L}{R_1} \right) = R_1 \left(1 + j \frac{\omega}{\omega_0} \right)”$$

p. 371: Figure 8.28:

The dashed lines in the two diagrams refer to the circuit in Figure 8.20. The solid lines in the two diagrams refer to the circuit in Figure 8.27 (Example 8.7).

p. 371: CHECK YOUR UNDERSTANDING:

“... for the filter of Example 8.6 at the cutoff ...”

should read

“... for the filter of Example 8.7 at the cutoff ...”

p. 372:

“... the *analog computer*, which is discussed in Section 8.5. Example 8.8 illustrates ...”

should read

“... the *analog computer*. Example 8.8 illustrates ...”

Chapter 9 – Semiconductors and Diodes

p. 408: Learning Objectives: 4: “*Section 9.4.*” should read “*Sections 9.4, 9.5.*”

p. 426: Example 9.5, Solution, Analysis, the equation

$$“R_T = R_1 + R_2 + R_3 \parallel R_4”$$

should read

$$“R_T = R_3 + R_4 + R_1 \parallel R_2”$$

p. 433: second line below Figure 9.42

“... shown in Figure 9.43(a) for the case ...”

should read

“... shown in Figure 9.43(a,b) for the case ...”

p. 433: third line below Figure 9.42

“Figure 9.43(b) depicts ...”

should read

“Figure 9.43(c) depicts ...”

p. 433: fourth line below Figure 9.42

“... waveform of Figure 9.43(b) is not ...”

should read

“... waveform of Figure 9.43(c) is not ...”

p. 434: Example 9.8, Problem

“... similar to that in Figure 9.25, is used ...”

should read

“... similar to that in Figure 9.29, is used ...”

p. 436: CHECK YOUR UNDERSTANDING:

“... rectifier of Figure 9.40, assuming ...”

should read

“... rectifier of Figure 9.41, assuming ...”

p. 442: Example 9.12, Solution, Analysis, the equation:

$$... + V_Z \left(\frac{R_S \parallel R_L}{r_Z \parallel R_L + R_S} \right) = ...$$

should read

$$\dots + V_Z \left(\frac{R_S \parallel R_L}{R_S \parallel R_L + r_Z} \right) = \dots$$

p. 448: Problem 9.36:

“... that of Figure 9.25 in the text ...”

should read

“... that of Figure 9.29 in the text ...”

p. 448: Problem 9.37:

“... that of Figure 9.25 in the text ...”

should read

“... that of Figure 9.29 in the text ...”

Chapter 10 – Bipolar Junction Transistors

p. 460: third equation from the top

$$“V_C = V_3 = 8 \text{ V}”$$

should read

$$“V_C = V_3 = 4 \text{ V}”$$

This changes the following equations:

$$“I_C = \frac{V_{CC} - V_C}{R_C} = \frac{12 - 8}{1,000} = 4 \text{ mA}” \text{ should read } “I_C = \frac{V_{CC} - V_C}{R_C} = \frac{12 - 4}{1,000} = 8 \text{ mA}”$$

$$“\frac{I_C}{I_B} = \beta = 80 \quad \frac{I_C}{I_B} = \beta = 80 \quad \frac{I_C}{I_B} = \beta = 80” \text{ should read } “\frac{I_C}{I_B} = \beta = 160”$$

$$\text{and } “V_{CE} = V_C - V_E = 8 - 1.3 = 6.7 \text{ V}” \text{ should read } “V_{CE} = V_C - V_E = 4 - 1.3 = 2.7 \text{ V}”$$

to values which now match Figures 10.8 and 10.9.

p. 465: fourth line from top

“Thus, the diode operating at a higher temperature ...”

should read

“Thus, the transistor operating at a higher temperature ...”

p. 472: Example 10.7, Solution, Analysis/Comments:

$$“V_{CEQ} = 7 \text{ V} \quad I_{CQ} = 22 \text{ mA} \quad I_{BQ} = 150 \mu\text{A}”$$

should read

$$“V_{CEQ} = 6 \text{ V} \quad I_{CQ} = 25 \text{ mA} \quad I_{BQ} = 150 \mu\text{A}”$$

This lead to changing

$$“P_{CQ} = V_{CEQ} \times I_{CQ} = 154 \text{ mW}.” \text{ to } “P_{CQ} = V_{CEQ} \times I_{CQ} = 150 \text{ mW}”$$

p. 478: CHECK YOUR UNDERSTANDING:

$$“R_C = 1 \text{ k}\Omega, B = 100, \text{ and } V_{CC} = 14 \text{ V}.”$$

should read

$$“R_C = 1 \text{ k}\Omega, \beta = 100, \text{ and } V_{CC} = 14 \text{ V}.”$$

p. 479: Eighth line from top

“... if both v_a and v_b are 0.” should read “... if both v_a and v_b are 0.”

p. 481: Example 10.10, Solution, Analysis, 2.

“... that diode D_1 is still forward-biased, but diode D_2 is now ...”

should read

“... that diode D_2 is still forward-biased, but diode D_1 is now ...”

p. 481: Example 10.10, Solution, Analysis, 4.

$$“V_{out} = V_{CC} - I_C R_3 = \dots \text{ should read } “V_{out} = V_{CEsat} = 0.2 \text{ V}”$$

p. 487: Figure P10.36:

There should be a dot at the intersection of the circuit paths joining R_1 , R_2 , C_b , and the transistor to indicate that the two crossing paths are connected.

p. 487: Figure P10.37:

The transistor figure is incorrectly drawn (the emitter symbol should be shifted to a lower position)

Chapter 11 – Field Effect Transistors

p. 499: Example 11.3, Solution, Analysis

$$i_{DQ} = K(v_{GS} - V_T)^2 = 48.5(2.4 - 1.4) = 48.5 \text{ mA}$$

should read

$$“i_{DQ} = K(v_{GS} - V_T)^2 = 48.5 \times 10^{-3}(2.4 - 1.4) = 48.5 \text{ mA}”$$

p. 504: Equation 11.11

The second equation of 11.11 is missing a term. However, the whole second equation may be eliminated because it is duplicated with the missing term present in the first equation of 11.12.

p. 506: 4 lines above Figure 11.14

“ $V_{DD} - V_B < v_G - V_T$ so actually ...”

should read

“so actually ...”

p. 512: Example 11.8, Solution, Analysis:

“ $v_{GSQ} = 0 \text{ V}$ ” should read “ $v_{GSQ} = 2.5 \text{ V}$ ”

p. 513: Example 11.9, Solution, Analysis

The analysis needs substantial revision,

When an input is off (low voltage), the corresponding NMOS will be off and the corresponding PMOS will be on. When an input is high, the corresponding NMOS will be on and the corresponding PMOS will be off. Therefore, the analysis for case 1 ($v_1 = v_2 = 0$) should be that M_1 and M_2 are off that and M_3 and M_4 are on, as is indicated in Figure 11.21. This will result in $v_{out} = 5 \text{ V}$. The analysis for case 2 ($v_1 = 5 \text{ V}$ and $v_2 = 0 \text{ V}$) should be that v_1 turns M_1 on and M_3 off. Since v_2 still is 0, M_2 remains off and M_4 remains on. This will result in $v_{out} = 0 \text{ V}$. There is no figure that corresponds to this configuration shown. The analysis for case 3 ($v_1 = 0 \text{ V}$ and $v_2 = 5 \text{ V}$) should be that v_1 leaves M_1 off and M_3 on as it did in case 1. Since v_2 is now 5 V, M_2 will be on and M_4 will be off. This will result in $v_{out} = 0 \text{ V}$. There is no figure that corresponds to this configuration shown. The analysis for case 4 is correct and corresponds to Figure 11.22(c). Figures 11.22(a) and 11.22(b) can not be created using the inputs available to Figure 11.20. In the table, when $v_1 = v_2 = 0 \text{ V}$, M_3 will be **Off**, when $v_1 = 0 \text{ V}$ and $v_2 = 5 \text{ V}$, M_4 will be **On**. Otherwise, the table is correct.

Note: this will have to be essentially re-written, if the above comments are correct. For now I am moving forward.

Chapter 12 – Digital Logic Circuits

p. 522: Learning Objectives: 7.

“Section 12.7”

should read

“Section 12.6”

p. 535: **Example 12.3, Solution, Analysis**, last line on the page:

“Rules 2 and 6”

should read

“Rules 2, 6, and 14”

p. 546: three lines below Figure 12.31

“... four-variable map of Figure 12.29 are shown in Figure 12.32.”

should read

“... four-variable map of Figure 12.31 are shown in Figure 12.32.”

p. 547: The second line of the only equation on the page:

$$+\overline{W} \cdot \overline{X} \cdot Y \cdot \overline{Z} + \overline{W} \cdot X \cdot Y \cdot \overline{Z} + W \cdot X \cdot Y \cdot \overline{Z} + W \cdot \overline{X} \cdot Y \cdot \overline{Z}$$

should read

$$+\overline{W} \cdot \overline{X} \cdot \overline{Y} \cdot Z + \overline{W} \cdot X \cdot \overline{Y} \cdot Z + W \cdot X \cdot \overline{Y} \cdot Z + W \cdot \overline{X} \cdot \overline{Y} \cdot Z$$

P. 555: Example 12.19, Problem

“Find a minimum product-of-sums realization ...”

should read

“Find a minimum sum-of-products realization ...”

p. 556: Example 12.20, Solution, Analysis

“By appropriately selecting three of the four don’t care entries ...”

should read

“By appropriately selecting four of the five don’t care entries ...”

p. 564: last line on the page:

“... whenever the enable input is high, the flip-flop is set.”

should read

“... whenever the enable input is high, the flip-flop is set to the value of S ”

p. 565: Figure 12.64(b):

This is not an error, but the diagram could be improved to provide a more effective explanation: the Preset and Clear are on for most of the timing diagram. Therefore, the timing of the enable is not effectively shown.

p. 565: Figure 12.64(c):

This is the schematic for a \overline{RS} quad latch (latch is another name for a flip-flop), rather than the RS latch described in parts (a) and (b).

p. 569: Example 12.33, Solution, Find:

“Output of RS flip-flop ...”

should read

“Output of JK flip-flop ...”

p. 574: Example 12.25, Analysis

The analysis section assumes (without explicitly stating) that the Preset and Clear are only effective on a clock pulse. Although this doesn't correlate to statements earlier in the text, it is correct for many commercially available latches.

Note: we will need to review earlier statements in the text to find the claimed inconsistency.

Chapter 13 – Principles of Electromechanics

p. 597: line below equation 13.25

“In equation 13.24, l represents the length of the coil wire;”

should read

“In equation 13.24, l represents the length of the core;”

p. 604: Figure 13.19:

The length of the gap should be 0.0025 m

p. 605: **Example 13.3, Solution, Analysis, 3.** Calculation of reluctance

In the calculation of \mathcal{R}_{gap} , the final value should be 2.55 instead of 3.98.

In the calculation of \mathcal{R}_{eq} , the final value should be 2.57 instead of 4.

In the calculation of ϕ , the final value should be 3.92 instead of 2.51.

p. 620: Example 13.9, Solution, Analysis:

“The force we must overcome is $mg = 98 \text{ N}$.”

should read

“The force we must overcome is $mg = 49 \text{ N}$.”

p. 620: Example 13.9, Solution, Analysis:

$$i^2 = f_{\text{gravity}} \frac{\mu_0 A \left(\frac{2x}{\mu_0 A} + \frac{l_1 + l_2}{\mu_0 \mu_r A} \right)^2}{N^2} = 6.5 \times 10^4 \text{ A} \quad i = 255 \text{ A}$$

should read:

$$i^2 = f_{\text{gravity}} \frac{\mu_0 A \left(\frac{2x}{\mu_0 A} + \frac{l_1 + l_2}{\mu_0 \mu_r A} \right)^2}{N^2} = 5.2 \times 10^5 \text{ A} \quad i = 721 \text{ A}$$

p. 620: Example 13.9, Solution, Analysis:

$$i^2 = f_{gravity} \frac{\mu_0 A \left(\frac{l_1 + l_2}{\mu_0 \mu_r A} \right)^2}{N^2} = 2.1056 \times 10^{-3} \text{ A}$$

$$i = 0.0459 \text{ A}$$

should read:

$$i^2 = f_{gravity} \frac{\mu_0 A \left(\frac{l_1 + l_2}{\mu_0 \mu_r A} \right)^2}{N^2} = 4.21 \times 10^{-3} \text{ A}$$

$$i = 0.0649 \text{ A}$$

p. 622: Example 13.10, Solution, Analysis:

The final answer should be 178 A-turns instead of 56.4 A-turns.

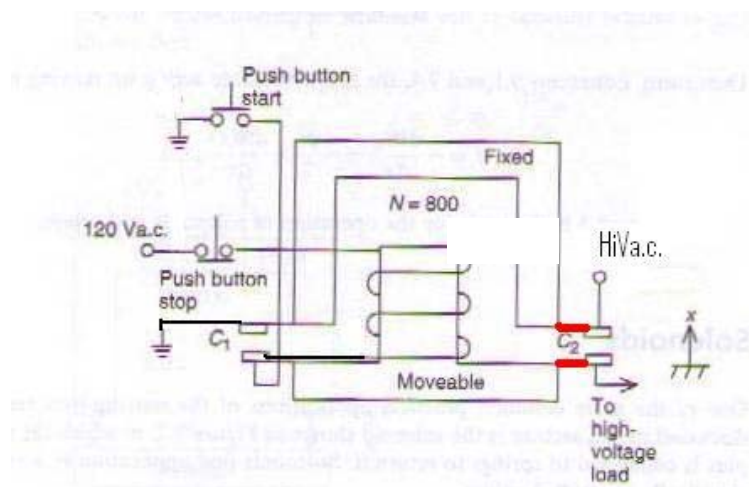
P. 625: **Practical facts about solenoids**, text next to Figure 13.38

“... bypassing the resistor through the NC switch, connecting the resistor in series ...”

should read

“... bypassing the resistor through the NC switch. When the solenoid closes, the NC switch opens, connecting the resistor in series ...”

p. 625: Figure 13.39 is not correct. Please refer to the following figure:



p. 626. Figure 13.42:

In order to match the example, the gap should be shown as $x = 5 \text{ cm}$ rather than $x = 0.5 \text{ cm}$. If the $\frac{1}{2} \text{ cm}$ gap is used, the required current will be approximately 200 mA.

Note that in the example the value $x = 0.05 \text{ m}$ (5 cm) is used.

p. 630: text to the right of Figure 13.44

“The **Bli** law just illustrated ...” should read “The **Blu** law just illustrated ...”

p. 630: Equation 13.62:

$P_M - f_{ext}u = Bliu$ should read $P_M = f_{ext}u = Bliu$

p. 641: Figure P13.41:

The electrical portion of this figure is incorrect. See the correction to Figure 13.39 above.

Chapter 14 – Introduction to Electric Machines

p. 652: Example 14.1, Solution, Analysis

The equation:

$$SR\% = \dots = \frac{1,800 - 1760}{1,800} \times \dots$$

should read:

$$SR\% = \dots = \frac{1,800 - 1760}{1,760} \times \dots$$

p. 658: Figure 14.11:

N and S are reversed

p. 658: in the paragraph starting with “Often...”

“The north and south poles indicated in the figure are a consequence of the fact that the flux exits the bottom part of the structure (thus, the north pole indicated in the figure) and enters the top half of the structure (thus, the south pole).”

should read

“The north and south poles indicated in the figure are a consequence of the fact that the flux exits the top part of the structure (thus, the north pole indicated in the figure) and enters the bottom half of the structure (thus, the south pole).”

p. 679: Example 14.9, Solution, Analysis:

$$-K_{T,PM} I_a(t) + J \frac{d\omega(t)}{dt} + b\omega(t) = T_{load}(t)$$

should read:

$$-K_{T,PM} I_a(t) + J \frac{d\omega(t)}{dt} + b\omega(t) = -T_{load}(t)$$

p. 679: The equation:

$$-K_{T,PM} I_a(s) + (sJ + b)\Omega(s) = T_{load}(s)$$

should read:

$$-K_{T,PM} I_a(s) + (sJ + b)\Omega(s) = -T_{load}(s)$$

p. 679: The equation:

$$\begin{bmatrix} sL_a + R_a & K_{a,PM} \\ -K_{T,PM} & sJ + b \end{bmatrix} \begin{bmatrix} I_a(s) \\ \Omega_m(s) \end{bmatrix} = \begin{bmatrix} V_L(s) \\ T_{load}(s) \end{bmatrix}$$

should read:

$$\begin{bmatrix} sL_a + R_a & K_{a,PM} \\ -K_{T,PM} & sJ + b \end{bmatrix} \begin{bmatrix} I_a(s) \\ \Omega_m(s) \end{bmatrix} = \begin{bmatrix} V_L(s) \\ -T_{load}(s) \end{bmatrix}$$

p. 679: The equation:

$$\Omega_m(s) = \frac{\det \begin{bmatrix} sL_a + R_a & V_L(s) \\ -K_{T,PM} & T_{load}(s) \end{bmatrix}}{\det \begin{bmatrix} sL_a + R_a & K_{a,PM} \\ -K_{T,PM} & sJ + b \end{bmatrix}}$$

should read:

$$\Omega_m(s) = \frac{\det \begin{bmatrix} sL_a + R_a & V_L(s) \\ -K_{T,PM} & -T_{load}(s) \end{bmatrix}}{\det \begin{bmatrix} sL_a + R_a & K_{a,PM} \\ -K_{T,PM} & sJ + b \end{bmatrix}}$$

p. 680: the equation at the top of the page should have a minus sign in front of $T_{load}(s)$.

p. 695: Example 14.14, Problem

“...Figures 14.39 to 14.41.” should read “...Figures 14.38 to 14.40.”