Errata for **ELECTRIC MACHINERY**, 7'th edition

Figure 1.25: The figure should read $T_2 > T_1$.

Equation 4.65 Should read

$$v_\mathrm{r} = R_\mathrm{r} i_\mathrm{r} + L_\mathrm{rr} \frac{di_\mathrm{r}}{dt} + L_\mathrm{sr} \cos(\theta_\mathrm{me}) \frac{di_\mathrm{s}}{dt} - L_\mathrm{sr} i_\mathrm{s} \sin(\theta_\mathrm{me}) \frac{d\theta_\mathrm{me}}{dt}$$

Problem 7.15: Part (a) Should read

> Calculate the field current, terminal current and torque corresponding to operation at a speed of 2400 r/min, an armature terminal voltage of 250 V and a load of 75 kW.

Problem 7.16: The second paragraph of the problem statement should read:

> .... whose torque varies linearly within this speed range.

Problem 7.19: The power in both parts (a) and (c) should be 25 kW, not 30 kW.

Example 8.3:

- The first equation in Part (b) should read

$$i_1(t) = i_1(t_1) + \frac{\int_{t_1}^{t} v_1 dt}{L_{11}(t)} = i_1(t_1) + \frac{V_2 (t - t_1)}{L_{11}(t)}$$

- In the solution to part (c), the sentences which starts with "The integral under ..." should read:

> The integral under the positive torque curve is 0.228 N·m·sec while that under the negative portion of the torque curve is 0.030 N·m·sec. Thus we see that the negative torque produces a 13.2 percent reduction in average torque from that which would otherwise be available if the current could be reduced instantaneously to zero.

Equation 9.7: Should read

$$P_\mathrm{gap,f} = I_\mathrm{main}^2 (0.5 R_\mathrm{f})$$

Equation 9.9: Should read

$$P_\mathrm{gap,b} = I_\mathrm{main}^2 (0.5 R_\mathrm{b})$$

Problem 9.14:, Part (c): Should read

> Show that if the stator voltage $\hat{V}_\alpha$ and $\hat{V}_\beta$ of a ...

Example 10.5:

- Part (a): The solution for $V_{\rm a0}$ should read

$$V_{\rm a0} \approx E_{\rm a} = K_{\rm f} I_{\rm f} \omega_{\rm m} = 439.7$$

- Part (c): The solution for G should read

$$G = \frac{V_{\rm a} - V_{\rm a0}}{\omega_{\rm ref} - \omega_{\rm m}} = \frac{445.8 - 439.7}{230.4 - 228.8} = 3.8 \text{ V/(rad/sec)}$$

Problem 10.1: Second sentence should read

> The motor has an armature resistance of 163 mΩ ...

Problem 10.10, Part (b): Should read

> The current source is supplying ....

Problem 10.20: Should read

> In order to achieve this operating condition with a reasonable armature terminal voltage, the field-oriented control algorithm is changed to one which results in unity terminal-power-factor operation at rated terminal voltage. Based upon that algorithm, calculate the field current, the armature current and the direct- and quadrature-axis currents $i_{\rm D}$ and $i_{\rm Q}$.

Problem 10.21: Should read

> Consider a 450-kW, 2300-V, 50-Hz, 6-pole synchronous motor with a synchronous reactance of 1.32 per unit and AFNL = 11.7 A. It is to be operated under a field-oriented control such that the armature flux linkages remain at their rated value and with minimum armature current at each operating point. It will be used to drive a load whose torque varies quadratically with speed and whose torque at a speed of 1000 r/min is 4100 N·m. The complete drive system will include a speed-control loop such as that shown in Fig. 10.14b. Write a MATLAB script to plot the field current, direct- and quadrature axis currents, the armature current over the speed-range 0-1000 r/min.

Problem 10.22: First sentence should read

... saturated synchronous reactance of 1.15 per unit ...

Problem 10.27, Part (c) : First sentence should read

... in excess of that found in part (b), flux ...