Corrections for

# Simulation of Power Electronic Circuits

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1. Page 4.16, Problem 1(a):
   The correct analytic solution is $\hat{x}(t) = (2 - 3\,t^2)\,e^{-t/2}$.

2. Page 5.7: The correct equation (5.17) is as follows.

$$\begin{aligned} f(t,x) &= f(t_n,x_n) + f_t(t_n,x_n)(t-t_n) + f_x(t_n,x_n)(x-x_n) \\ &+ \frac{1}{2\,!}\,[f_{tt}(t_n,x_n)(t-t_n)^2 + 2\,f_{tx}(t_n,x_n)(t-t_n)(x-x_n) + \\ &\qquad f_{xx}(t_n,x_n)(x-x_n)^2] \\ &+ \text{Higher-order terms}\,. \end{aligned}$$

3. Page 5.14: The correct system of equations is

$$\begin{aligned} x_1' &= x_1 x_2 - a\,, \\ x_2' &= x_1 - bt\,, \end{aligned}$$

4. Page 5.18: The actual error at $t = 0.18\cdots$
   should be replaced with
   The actual error at $t = 0.14\cdots$

5. Page 5.20: Eq. 5.53 should read

$$x_{n+1} = x_n + h\sum_{i=0}^{p-1}\beta_i\,f_{n-i}\ .$$

6. Page 5.22: Eq. 5.56 should read

$$x(t_{n+1}) = x(t_n) + h\left[\frac{5}{12}\,f_{n+1} + \frac{8}{12}\,f_n - \frac{1}{12}\,f_{n-1}\right].$$

7. Page 5.24: Eq. 5.65 should read

$$\begin{aligned} \frac{dx}{du}(u) &= \frac{1}{h^2}\left[x_{n+1}\,\frac{2u+h}{2} - x_n\,2u + x_{n-1}\,\frac{2u-h}{2}\right] \\ &+ \frac{d}{du}\left[\frac{1}{3\,!}\,x^{(3)}(\xi)(u-u_1)(u-u_2)(u-u_3)\right]. \end{aligned}$$

8. Page 5.34, Section 5.3, second paragraph, first line:
   Eq. 5.8 $\longrightarrow$ Eq. 5.6

9. Page 5.41, caption for Fig. 5.10:
   $\dot{x} = x^3 - 6\,x^2 + 5\,x + 8$
   should be replaced with
   $\dot{x} = t^3 - 6\,t^2 + 5\,t + 8$

10. Page 5.45: Note that the signs of $\alpha_0$ and $\alpha_1$ in Eq. 5.115 are not consistent with Eq. 5.114. $\alpha_0$ and $\alpha_1$ in Eq. 5.115 should be replaced with $-\alpha_0$ and $-\alpha_1$, respectively. The exactness constraints also change, but the final formula does not get affected.

11. Page 5.48: Eq. 5.125 should read

$$x_i = (c_1 + c_2\, i)\, z_1^i\,.$$

12. Page 5.48: Eq. 5.126 should read

$$z^{k-1} \sum_{i=-1}^{k} \alpha_i\, z^{1-i} = 0$$

13. Page 5.50: Eq. 5.133 should read

$$z^2 - \left(1 + \frac{3h\lambda}{2}\right) z + \frac{h\lambda}{2} = 0$$

14. Page 5.61:
$\cdots$ $h$ is required to be smaller than $2/|\lambda_1|$ or 0.091 s.
should be replaced with
$\cdots$ $h$ is required to be smaller than $2/|\lambda_2|$ or 0.0091 s.

15. Page 5.68: The correct RKF-4/5 Butcher arrays are given by

| | | | | | |
|---|---|---|---|---|---|
| 0 | | | | | |
| $\frac{1}{4}$ | $\frac{1}{4}$ | | | | |
| $\frac{3}{8}$ | $\frac{3}{32}$ | $\frac{9}{32}$ | | | |
| $\frac{12}{13}$ | $\frac{1932}{2197}$ | $-\frac{7200}{2197}$ | $\frac{7296}{2197}$ | | |
| 1 | $\frac{439}{216}$ | -8 | $\frac{3680}{513}$ | $-\frac{845}{4104}$ | |
| | $\frac{25}{216}$ | 0 | $\frac{1408}{2565}$ | $\frac{2197}{4104}$ | $-\frac{1}{5}$ |

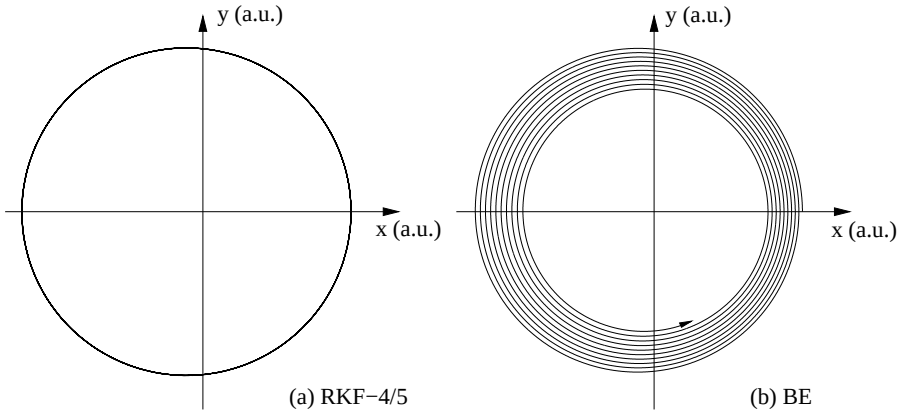
$4^{\text{th}}$-order array

| | | | | | | |
|---|---|---|---|---|---|---|
| 0 | | | | | | |
| $\frac{1}{4}$ | $\frac{1}{4}$ | | | | | |
| $\frac{3}{8}$ | $\frac{3}{32}$ | $\frac{9}{32}$ | | | | |
| $\frac{12}{13}$ | $\frac{1932}{2197}$ | $-\frac{7200}{2197}$ | $\frac{7296}{2197}$ | | | |
| 1 | $\frac{439}{216}$ | -8 | $\frac{3680}{513}$ | $-\frac{845}{4104}$ | | |
| $\frac{1}{2}$ | $-\frac{8}{27}$ | 2 | $-\frac{3544}{2565}$ | $\frac{1859}{4104}$ | $-\frac{11}{40}$ | |
| | $\frac{16}{135}$ | 0 | $\frac{6656}{12825}$ | $\frac{28561}{56430}$ | $-\frac{9}{50}$ | $\frac{2}{55}$ |

$5^{\text{th}}$-order array

16. Page 5.82:
$\cdots$ if $V_2 > 0$ $V, R_D = R_{\text{on}}$ $\cdots$
should be replaced with
$\cdots$ if $V_2 < 0$ $V, R_D = R_{\text{on}}$ $\cdots$

17. Page 5.85, Fig. 5.44: The correct figure is given below. (The x-axis label was not displayed correctly in the original figure.)




(a) RKF−4/5 (b) BE

18. Page 5.90:
    $\cdots$ since the $RC$ time constant is small (approximately $R_sC$, $R_s$ being the resistance presented by the closed switch).
    should be replaced with
    $\cdots$ since the $RC$ time constant is small ($R_sC$, $R_s$ being the resistance presented by the closed switch).

19. Page 5.92:
    Up to a certain value (about $10^{-6}$), $\cdots$
    should be replaced with
    Up to a certain value of $\epsilon$ (about $10^{-6}$), $\cdots$