# Errata

## Chapter 1

**p. 27**$_3$ added material:

$$f(kT_{s)} = \frac{5}{3}\left(1 - e^{-0.916k}\right), \qquad k = 0, 1, 2, \ldots$$

change for

$$f(kT_{s)} = \frac{5}{3}\left(1 - e^{-0.916k}\right) = \frac{5}{3}\left(1 - \left(\frac{2}{5}\right)^k\right), \qquad k = 0, 1, 2, \ldots$$

**p. 30, (1.4.6)** delete $q^{-d}()$:

$$B(q^{-1}) = q^{-d}(b_1 q^{-1} + b_2 q^{-2} + \cdots + b_m q^{-m})$$

change for

$$B(q^{-1}) = b_1 q^{-1} + b_2 q^{-2} + \cdots + b_m q^{-m}$$

**p. 29-30 errors is discretisation** $T_s + 2$ change for $T_s + 1$

$$G(s) = \frac{Z_2}{(T_1 s + 1)(T_2 s + 2)}, \qquad T_1 \neq T_2$$

change for

$$G(s) = \frac{Z_2}{(T_1 s + 1)(T_2 s + 1)}, \qquad T_1 \neq T_2$$

4 changes in $b_1, b_2, a_1, a_2$:

$$\begin{aligned}
b_1 &= Z_2 T_1 T_2 \left[ -\left(e^{-\frac{T_s}{T_1}} + e^{-\frac{T_s}{T_2}}\right) - \frac{T_1(1 + e^{-\frac{T_s}{T_2}})}{T_2 - T_1} + \frac{T_2(1 + e^{-\frac{T_s}{T_1}})}{T_2 - T_1} \right] \\
b_2 &= Z_2 T_1 T_2 \left[ e^{-\frac{T_s}{T_1}} e^{-\frac{T_s}{T_2}} + \frac{T_1 e^{-\frac{T_s}{T_2}}}{T_2 - T_1} - \frac{T_2 e^{-\frac{T_s}{T_1}}}{T_2 - T_1} \right] \\
a_1 &= -\left(e^{-\frac{T_s}{T_1}} + e^{-\frac{T_s}{T_1}}\right) \\
a_2 &= e^{-\frac{T_s}{T_1}} e^{-\frac{T_s}{T_1}}
\end{aligned}$$

change for

$$
\begin{aligned}
b_1 &= Z_2\left[-\left(e^{-\frac{T_s}{T_1}}+e^{-\frac{T_s}{T_2}}\right)-\frac{T_1(1+e^{-\frac{T_s}{T_2}})}{T_2-T_1}+\frac{T_2(1+e^{-\frac{T_s}{T_1}})}{T_2-T_1}\right]\\
b_2 &= Z_2\left[e^{-\frac{T_s}{T_1}}e^{-\frac{T_s}{T_2}}+\frac{T_1e^{-\frac{T_s}{T_2}}}{T_2-T_1}-\frac{T_2e^{-\frac{T_s}{T_1}}}{T_2-T_1}\right]\\
a_1 &= -\left(e^{-\frac{T_s}{T_1}}+e^{-\frac{T_s}{T_2}}\right)\\
a_2 &= e^{-\frac{T_s}{T_1}}e^{-\frac{T_s}{T_2}}
\end{aligned}
$$

## Chapter 5

**p. 209, (5.3.20)** missing formula with this number – deleted number.

**p. 212, (5.3.40)** missing term:

$$= C\frac{A\Delta+\sum_{j=N_1}^{N_2}k_jz^{j-1}(B-G_j)}{\sum_{j=N_1}^{N_2}k_j}$$

change for

$$= C\frac{A\Delta+\sum_{j=N_1}^{N_2}k_jz^{j-1}(B-A\Delta G_j)}{\sum_{j=N_1}^{N_2}k_j}$$

**p. 213, (5.3.53), (5.3.54)** matrix $\bar{C}$ must be inside:

$$\boldsymbol{G}=\bar{\boldsymbol{C}}\begin{pmatrix}\bar{\boldsymbol{B}} & \boldsymbol{0} & \dots & \dots & \boldsymbol{0}\\ \bar{\boldsymbol{A}}\bar{\boldsymbol{B}} & \bar{\boldsymbol{B}} & \boldsymbol{0} & \dots & \boldsymbol{0}\\ \vdots & & \ddots & \ddots & \vdots\\ \vdots & & & \bar{\boldsymbol{B}} & \boldsymbol{0}\\ \bar{\boldsymbol{A}}^{N_2-1}\bar{\boldsymbol{B}} & \dots & & \dots & \bar{\boldsymbol{B}}\end{pmatrix}$$

and

$$\boldsymbol{y}_0=\bar{\boldsymbol{C}}\begin{pmatrix}\bar{\boldsymbol{A}}\\ \bar{\boldsymbol{A}}^2\\ \vdots\\ \bar{\boldsymbol{A}}^{N_2}\end{pmatrix}\bar{\boldsymbol{x}}(k)$$

change for

$$\boldsymbol{G} = \begin{pmatrix} \bar{\boldsymbol{C}}\bar{\boldsymbol{B}} & \boldsymbol{0} & \dots & \dots & \boldsymbol{0} \\ \bar{\boldsymbol{C}}\bar{\boldsymbol{A}}\bar{\boldsymbol{B}} & \bar{\boldsymbol{C}}\bar{\boldsymbol{B}} & \boldsymbol{0} & \dots & \boldsymbol{0} \\ \vdots & & \ddots & \ddots & \vdots \\ \vdots & & & \bar{\boldsymbol{C}}\bar{\boldsymbol{B}} & \boldsymbol{0} \\ \bar{\boldsymbol{C}}\bar{\boldsymbol{A}}^{N_2-1}\bar{\boldsymbol{B}} & \dots & & \dots & \bar{\boldsymbol{C}}\bar{\boldsymbol{B}} \end{pmatrix}$$

and

$$\boldsymbol{y}_0 = \begin{pmatrix} \bar{\boldsymbol{C}}\bar{\boldsymbol{A}} \\ \bar{\boldsymbol{C}}\bar{\boldsymbol{A}}^2 \\ \vdots \\ \bar{\boldsymbol{C}}\bar{\boldsymbol{A}}^{N_2} \end{pmatrix} \bar{\boldsymbol{x}}(k)$$

**p. 221, (5.5.8)** added reference to the matrix inversion lemma, incorrect sign in the element (2,2) of the inverse matrix:

The block matrix inversion formula states

$$\begin{pmatrix} A^{-1} & D \\ C & B \end{pmatrix}^{-1} = \begin{pmatrix} A + AD\Delta CA & -AD\Delta \\ -\Delta CA & -\Delta \end{pmatrix}, \quad \Delta^{-1} = B - CAD$$

change for

The block matrix inversion formula states (see its proof of Lemma 2.3.1 on page 58)

$$\begin{pmatrix} A^{-1} & D \\ C & B \end{pmatrix}^{-1} = \begin{pmatrix} A + AD\Delta CA & -AD\Delta \\ -\Delta CA & \Delta \end{pmatrix}, \quad \Delta^{-1} = B - CAD$$

**p. 229, Fig. 5.7.1** typo: $N_1$ change for $N_2$.