Errata for the monograph
Semi-Discretization for Time-Delay Systems –
Stability and Engineering Applications
by T. Insperger and G. Stépán

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A few errors have been identified by users of the book. This document serves as a
summary of the main typos and other types of mistakes in the book.

List of corrections

Page 4: Figure 1.1 in page 4 should be:

$$\begin{align*}
&\text{(a) Im} \\
&\lambda \\
&\text{Re} \\
&\text{(b) Im} \\
&\lambda \\
&\text{Re}
\end{align*}$$

Fig. 1.1 Critical characteristic exponents for linear autonomous ODEs: (a) Hopf
bifurcation, (b) and saddle-node bifurcation.

Page 11: Equation (1.36) should read:

$$\text{Ker}(\mu I - U(T)) \setminus \{0\} \neq \emptyset, \; \mu \neq 0,$$

Page 22: Equation (2.48) should read:

if $\omega \tau \neq k \pi, \; k \in \mathbb{N}$:

$$a_0 = \omega^2 - \frac{a_1 \omega \cos(\omega \tau)}{\sin(\omega \tau)}, \quad b_0 = \frac{-a_1 \omega}{\sin(\omega \tau)}.$$ 

Page 23: Equation (2.52) should read:

if $\omega = 0$:

$$k_p = -a_0, \quad k_d \in \mathbb{R},$$

Page 61: Equation (3.109) should read:

$$y(t) = \tilde{y}_0 + \tilde{y}_1 t + \tilde{y}_2 t^2 + \cdots,$$
Page 61: Equation (3.111) should read:

\[ B_j(t) = \tilde{B}_{j,0} + \tilde{B}_{j,0} t + \tilde{B}_{j,0} t^2 + \cdots, \]

Page 61: The sentence before equation (3.113) should read:

According to (3.71), \( |\tau_{j,0} - r_{j,0} h| < (1 + \frac{1}{2} q) h \), where \( q \) is the order of the approximation of the delayed term.

Page 61: Equation (3.114) should read:

\[ |\tilde{\tau}_{j,0} - r_{j,0} h| < \left( 1 + \frac{1}{2} q + \frac{1}{2} \tilde{\tau}_{j,1} \right) h + O(h^2). \]

Page 97: Equation (5.17) should read:

\[ \Omega = \frac{30 \omega}{j \pi - \arctan \left( \frac{\omega^2 - \omega_n^2}{2 \zeta \omega_n \omega} \right)}, \quad j = 0, 1, 2, \ldots, \]

Page 98: The diagram should be labeled as follows:

**Fig. 5.3** Stability chart and the number of unstable characteristic exponents for (5.13) with \( \zeta = 0.05 \).

Page 98: The sentence after equation (5.19) should read:

As can be seen, (5.17) and (5.18) give a pair of D-curves for each integer \( j \geq 1 \), one in the domain \( H > 0 \) associated with \( \omega > \omega_n \) and one in the domain \( H < 0 \) associated with \( \omega < \omega_n \).

Page 101: The sentences after equation (5.28) should read:

Figure 5.6 shows the stability chart in the plane of the dimensionless mean specific cutting-force coefficient \( H_0/\omega_n^2 \) and the dimensionless mean spindle speed \( \Omega_0/(60 f_n) \) for the high spindle speed domains (for lobes of indices \( j = 1, 2, 3, 4, 5 \)). A sinusoidal spindle speed modulation was considered, i.e., \( \Omega(t) = \Omega_0 + \Omega_1 \sin(2\pi t/T) \). The damping ratio was \( \zeta = 0.02 \).
Page 105: Equation (5.32) should read
\[ g_j(t) = \begin{cases} 
1 & \text{if } \varphi_{en} < (\varphi_j(t) \mod 2\pi) < \varphi_{ex}, \\
0 & \text{otherwise},
\end{cases} \]

Page 115: Equation (5.63) should read
\[ g_j(t, z) = \begin{cases} 
1 & \text{if } \varphi_{en} < (\varphi_j(t, z) \mod 2\pi) < \varphi_{ex}, \\
0 & \text{otherwise},
\end{cases} \]

Page 119: Equation (5.80) should read:
\[ \varphi_j(t) = \frac{2\pi}{60} \int_0^t \Omega(s)Ds + j \frac{2\pi}{N}. \]

Page 121: The label on the horizontal axes in the subplots of Figure 5.17 should be $\Omega_0$ [krpm].
The label on the horizontal axes in the subplots of Figure 5.18 should be $\Omega_0$ [rpm].

Page 133: The sentence after equation (5.139) should read:
where $T_p = \pi \sqrt{2I/(3g)}$ is the period of the small oscillations of the structure about its downward equilibrium.

Page 133: Equation (5.141) should read
\[ g(t) = \begin{cases} 
0 & \text{if } 0 \leq (t \mod T) < t_w, \\
1 & \text{if } t_w \leq (t \mod T) < t_w + t_a = T,
\end{cases} \]

Page 139: Equation (5.155) should read
\[ Q_{a kw} = \begin{cases} 
F_d & \text{if } 0 \leq (t \mod T) < t_w, \\
F_d - k_p(F_m(t - \tau) - F_d) & \text{if } t_w \leq (t \mod T) < t_w + t_a = T.
\end{cases} \]

Page 154: The sentence before equation (A.28) should read:
The system is asymptotically stable (i.e., all the zeros of the polynomial (A26) have negative real part) if and only if $a_0 > 0$ and all the leading principal minors of $H$ are positive.

Page 154: Equation (A.30) should read:
\[ H_3 = \det \begin{pmatrix} 
a_1 & a_0 & 0 \\
a_3 & a_2 & a_1 \\
a_5 & a_4 & a_3
\end{pmatrix} > 0 \]