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:

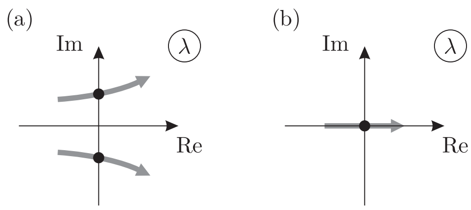

Fig. 1.1 Critical characteristic exponents for linear autonomous ODEs: (a) Hopf bifurcation, (b) and saddle-node bifurcation.

Page 11: Equation (1.36) should read:

$$\mathrm{Ker}(\mu\mathcal{I} - \mathcal{U}(T)) \setminus \{\mathbf{0}\} \neq \emptyset\ , \quad \mu \neq 0\ ,$$

Page 22: Equation (2.48) should read:

$$\text{if } \omega\tau \neq k\pi\ ,\ k \in \mathbb{N} : \quad a_0 = \omega^2 - \frac{a_1\omega\cos(\omega\tau)}{\sin(\omega\tau)}\ , \quad b_0 = \frac{-a_1\omega}{\sin(\omega\tau)}\ .$$

Page 23: Equation (2.52) should read:

$$\text{if } \omega = 0\ :\quad k_{\mathrm{p}} = -a_0\ , \quad k_{\mathrm{d}} \in \mathbb{R}\ ,$$

Page 61: Equation (3.109) should read:

$$\mathbf{y}(t) = \tilde{\mathbf{y}}_0 + \tilde{\mathbf{y}}_1 t + \tilde{\mathbf{y}}_2 t^2 + \cdots\ ,$$

Page 61: Equation (3.111) should read:

$$\mathbf{B}_j(t) = \tilde{\mathbf{B}}_{j,0} + \tilde{\mathbf{B}}_{j,0}t + \tilde{\mathbf{B}}_{j,0}t^2 + \cdots ,$$

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:

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

Page 97: Equation (5.17) should read:

$$\Omega = \frac{30\omega}{j\pi - \arctan\left(\dfrac{\omega^2 - \omega_{\mathrm{n}}^2}{2\zeta\omega_{\mathrm{n}}\omega}\right)} , \quad j = 0, 1, 2, \ldots ,$$

Page 98: Figure 5.3 should be

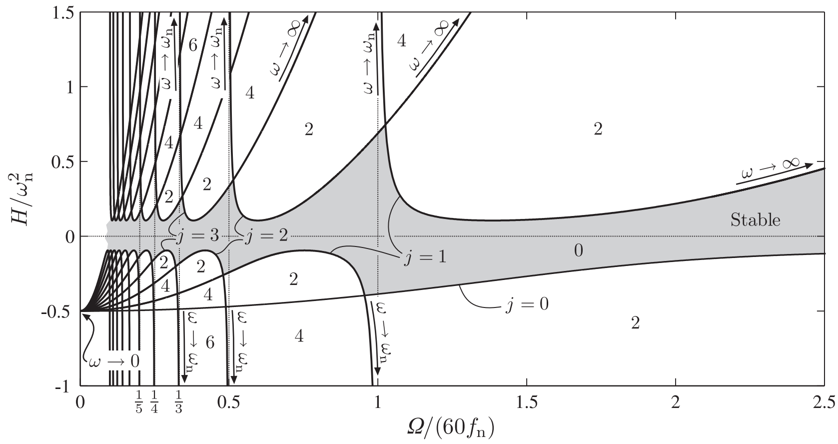

Fig. 5.3 Stability chart and the number of unstable characteristic exponents for (5.13) with $\zeta = 0.05$.

Page 98: The sentence the 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 $\omega > \omega_{\mathrm{n}}$ and one in the domain $H < 0$ associated with $\omega < \omega_{\mathrm{n}}$.

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

Figure 5.6 shows the stability chart in the plane of the dimensionless mean specific cutting-force coefficient $H_0/\omega_{\mathrm{n}}^2$ and the dimensionless mean spindle speed $\Omega_0/(60f_{\mathrm{n}})$ 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

$$g_j(t) = \begin{cases} 1 & \text{if } \ \varphi_{\text{en}} < (\varphi_j(t) \bmod 2\pi) < \varphi_{\text{ex}} \ , \\ 0 & \text{otherwise,} \end{cases}$$

Page 115: Equation (5.63) should read

$$g_j(t, z) = \begin{cases} 1 & \text{if } \ \varphi_{\text{en}} < (\varphi_j(t, z) \bmod 2\pi) < \varphi_{\text{ex}} \ , \\ 0 & \text{otherwise} \ , \end{cases}$$

Page 119: Equation (5.80) should read:

$$\varphi_j(t) = \frac{2\pi}{60} \int_0^t \Omega(s) \mathrm{D}s + j \, \frac{2\pi}{N} \ .$$

Page 121: The label on the horizontal axes in the subplots of Figure 5.17 should be Ω_0 [krpm].

The label on the horizontal axes in the subplots of Figure 5.18 should be Ω_0 [rpm].

Page 133: The sentence after equation (5.139) should read:

where $T_{\text{p}} = \pi \sqrt{2l/(3g)}$ is the period of the small oscillations of the structure about its downward equilibrium.

Page 133: Equation (5.141) should read

$$g(t) = \begin{cases} 0 & \text{if } \ 0 \leq (t \bmod T) < t_{\text{w}} \ , \\ 1 & \text{if } \ t_{\text{w}} \leq (t \bmod T) < t_{\text{w}} + t_{\text{a}} = T \ , \end{cases}$$

Page 139: Equation (5.155) should read

$$Q_{\text{a\&w}} = \begin{cases} F_{\text{d}} & \text{if } \ 0 \leq (t \bmod T) < t_{\text{w}} \ , \\ F_{\text{d}} - k_{\text{p}}(F_{\text{m}}(t - \tau) - F_{\text{d}}) & \text{if } \ t_{\text{w}} \leq (t \bmod T) < t_{\text{w}} + t_{\text{a}} = T \ . \end{cases}$$

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:

$$H_3 = \det \begin{pmatrix} a_1 & a_0 & 0 \\ a_3 & a_2 & a_1 \\ a_5 & a_4 & a_3 \end{pmatrix} > 0$$

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