Corrections to the book "Introduction to Time-Delay Systems: Analysis and Control" by E. Fridman

June 5, 2016

Chapter 1

- Page 8: in (1.17) and (1.18) change "$t > s$" to "$t > 0$", in (1.19) change "$\bar{t} > 2s$" to "$\bar{t} > s$".

- Page 10: change the last sentence of Section 1.1.5 from "The other parameters are constants depending on the properties of the laser" to "The other parameters depend on the properties of the laser".

- Page 14, line 15: Change "for $t \geq h$ (see Fig. 1.9)" to "for $t \geq 2h$ (see Fig. 1.9)".

- Page 18, line 16: Change "$t - \tau_K(t)$" to "$x(t - \tau_K(t))$".

Chapter 2

- Page 24, 4th bottom line: Change "It can be seen from (2.10)" to "It can be seen from (2.9)".

- Page 31, line 2 of Lemma: Change "solution" to "solutions".

- Page 31, line 2 of Lemma: Change "$\beta Re\, s < \alpha$" to "$\beta < Re\, s < \alpha$".

- Page 41 (the last equation) and page 42 (the first equation):
  "$(2(l + 1)\pi)$" should be changed by "$(\pi + 2l\pi)$".

- Page 45, Eq. (2.61) and page 47, Eq. (2.69): change "A_0" by "A".

- Pge 47, Proposition 2.4: change "A" by "A_0".

Chapter 3

- Page 66, line 4: "$q^* = a_1$" should be replaced by "$q^* = a$".

- Page 70, the line proceeding Eq. (3.43): "(3.31)" should be replaced by "(3.43)".

- Page 92, (3.105): the last line should read as

$$= \eta^T(t)\Phi\eta(t) + \eta^T(t)[hRA \quad 0 \quad hRA_1]^T R^{-1}[hRA \quad 0 \quad hRA_1]\eta(t)$$

- Page 96, line 12: Change "$\rho_{i,j}(t)$" to "$2\rho_{i,j}(t)$".

- Page 104, line 11: Change "$h_d^2 x^T(t)x(t)$" to "$h_d^2 x^T(t)R_d x(t)$".

- Page 105, line 15: Change "taking into account (3.136) and" to "taking into account (3.136), applying Schur complement and".

- Page 105, line 15:
  Change "$\eta(t) = col\{x(t), \int_{t-h_d}^t x(s)ds\}$" to "$\eta(t) = col\{x(t), \int_{t-h_d}^t x(s)ds, x(t)\}$".

- Page 107, the last line but one: Change "$h_d \int_{-h_d}^0$" to "$-h_d \int_{-h_d}^0$".

- Page 129, last line: there is a missing closing bracket ")" in the right-hand side of the differential equation (3.193).

Chapter 4

- Page 139, the last inequality of the proof should be non-strict:
$$\sup_{t^*-h \leq s \leq t^*} V(s) \leq \sup_{t^*-h \leq s \leq t^*} y_n(s).$$

- Page 139, the 3d bottom line of the proof should be read as "imply $D_-V(t^*) \geq \dot{y}_n(t^*)$".

- Page 140, Example 4.1, the 2nd sentence "It was found in [171]...": Change "1.15" to "−1.15".

- Page 141, the last equation: Change "x_0" by "$x(0)$".

- Page 143, (4.23), entry (4,4) of Ξ_δ: Change "$+S_{12} + S_{12}^T$" to "$-S_{12} - S_{12}^T$".

- Page 149, (4.38) and (4.39): Change "$\|G\|_\infty$" to "$\|G\|_\infty^2$".

- Page 151, (4.46): Remove "$+Dw(t)$".

- Page 151, line 23: Change "$\gamma = 0.25$" to "$\gamma = 0.2619$".

- Page 179, line 2 of Proposition 4.12: Change "$\delta \in (0, 1/T)$" to "$\delta \in (0, 1/(2T))$".

- Page 180, line 1 of Proposition 4.13: Change "$\delta \in (0, 1/T)$" to "$\delta \in (0, 1/(2T))$".

- Page 194, equation preceding (4.163): Change "$-\delta_1 z^2(x, -\tau(t))$" to "$-\delta_1 z^2(x, t - \tau(t))$".

- Page 194, (4.163): Change "$-\delta_1$" to "$-2\delta_1$".

Chapter 5

- Page 213, (5.42): Change
  "C_1^T", "$P_2^T B_1$" and $P_3^T B_1$ to "0", "$P_2^T B_1 - YD$" and "$\epsilon(P_2^T B_1 - YD)$" repectively.

- Page 214, line 25 (after A_d): Remove "$|\delta\rho| \leq \delta\rho_{max}$".

- Page 234, lines 7 and 9: Change "Sect.5.4.1" to "Sect.5.4.2".

- Page 234, line 9: Change "Sect.5.4.1" to "Sect.5.4.2".

- Page 234, line 12: Change "$(K_i - G_i)^T(K_i - G_i)$" to "$K_i^T K_i$".

- Page 236, line 17: After "$\varepsilon = 0.97$" add "$\sigma = 0.001$ and $\beta = 1$".

- Page 236, the last line: Change "$\tau(t) \leq 0.84$" to "$\tau(t) \leq 0.74$".

Chapter 6

- Page 250, (6.18), entry (1,2): Change "$P - P_2^T + A^T P_3$" to "$P - P_2^T + (A - I)^T P_3$".

- Page 250, (6.18), entry (1,3): Change "$P_2^T A + R$" to "$P_2^T A_1 + R$".

- Page 254, lines 5 and 7: Change "$=$" to "$\leq$".

- Page 254, (6.31): S_{12} should be multiplied by λ^h everywhere.

- Page 257, the last line, entry (1,2):
  Change "$P - P_2^T + (A + A_1)^T P_3$" to "$P - P_2^T + (A + A_1 - I_n)^T P_3$".

- Page 258, (6.44), entry (1,2):
  Change "$P - P_2^T + (A + A_1)^T P_3$" to "$P - P_2^T + (A + A_1 - I_n)^T P_3$".

- Page 263, (6.59): Change "x_0" to "$\phi(0)$" and "$k \leq 0$" to "$k < 0$".

- Page 264, (6.62): Change "$u(k)$" to "$x(k)$" and "$k \leq 0$" to "$k < 0$".

- Page 264, line 12, before "Choosing" add the sentences: "For simplicity, assume that $k - \tau_k \geq 0$ for all $k \in \mathbb{Z}_+$ and redefine $x(k) = x_0$ for $k < 0$. This assumption allows to avoid additional solution bounds on the first delay interval (cf. Sect. 5.4.2 and 6.3.1)."

- Page 264, (6.65): Change "$x^T(0) P x(0)$" to "$x^T(0)(P + hS)x(0)$".

- Page 265, (6.66), entry (1,2): Change "$\bar{P} - \bar{P}_2 + \epsilon \bar{P}_2^T A^T$" to "$\bar{P} - \bar{P}_2 + \epsilon \bar{P}_2^T (A - I)^T$".

- Page 265, lines 5 and 6 (after 6.67): change "P" to "$(P + hS)$".

- Page 265, (6.68): Change "x_0^T" to "$x^T(0)$" and "$\bar{P}$" to "$\bar{P} + h\bar{S}$".

- Page 265, line 1 of Proposition 6.5: change "x_0" to "$x(0)$".

- Page 265, the last line should be replaced by "$\phi(0) = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$."

- Page 266, line 2: Change "$K = -[0.4202\ 0.1313]$" to "$K = -[0.4030\ 0.1260]$".

- Page 266, line 3: Change "$\bar{\delta} = 0.0716$" to "$\bar{\delta} = 0.1488$".

- Page 268, line 2: Change "feasible on" to "feasible for".

Chapter 7

- Page 274, the last line: Change "$\max_{\theta \in [0,h]} | \int_0^\theta e^{A\xi} d\xi |$" to "$\max_{\theta \in [0,h]} | \int_0^\theta e^{A\xi} d\xi A_1 |$".

- Page 286, line 18: Change "col" to "$diag$".

References

- Page 353, item 63: Change "Automatica 45(2):194-201" to "Automatica 45(1):194-201"

- Page 353: Change item 64 to "Fridman E, Dambrine M (2009) Control under quantization, saturation and delay: An LMI approach. Automatica 45(10): 2258-2264"