Corrections to the book
Stability and Boundary Stabilization of 1-D Hyperbolic Systems

February 10, 2025

1. Page 3, line 8: replace "$\partial\psi/\partial Y$" by "$\partial\psi/\partial \mathbf{Y}$".

2. Page 4, line 9 : replace "∂Y" by "$\partial \mathbf{Y}$" in the expression of $B(x)$.

3. Page 22, line 1: replace "$P(t, L)$" by "$H(t, L) - Z(L)$". The correct boundary condition is
$$H(t, L) - Z(L) = \frac{P_a}{\rho g}.$$

4. Page 30, line -3: replace "$R_1 + R_2$" by "$R_1 + R_3$" in the expression of $\Lambda(\mathbf{R})$.

5. Page 30, the boundary condition "$dL/dt = V(t, L)$" is missing from equation (1.43). The corrected boundary condition (1.43) is:
$$m\frac{d^2 L}{dt^2} = F - s_p P(\varrho(t, L)), \qquad \frac{dL}{dt} = V(t, L).$$

6. Page 37. Everywhere in this page "B" should be "B^*".

7. Page 92, equation (3.23): "z_i" should read "z_ℓ" (twice).

8. Page 100, line 5: "R_ℓ" should be replaced by "R_L" in the expressions of "I^*" and "V^*" (three times).

9. Page 103, line 9: "the coefficients β_{ik} and γ_{ik}" should be replaced by "the coefficients α_{ij}, β_{ik} and γ_{ik}".

10. Page 114, line -11: in this inequation the first "λ_1^B" should be replaced by "λ_1^A". The correct expression is
$$T > \frac{L}{\lambda_2^A} - \frac{L}{\lambda_1^A} \approx 56\,s > \frac{L}{\lambda_2^B} - \frac{L}{\lambda_1^B} \approx 44\,s.$$

11. Page 138, equation (5.21): replace "$\mathrm{diag}\Lambda^{-1}(\mathbf{R})\mathbf{R}_t$" by "$\mathrm{diag}\big[\Lambda'(\mathbf{R})\mathbf{R}_t\big]$". *(The definition of "$\mathrm{diag}\big[\Lambda'(\mathbf{R})\mathbf{R}_t\big]$" is given page 125).*

12. Page 140, "diag" is missing from the right-hand side of equation (4.80). The corrected equation (4.80) is:

$$\mathcal{T}_2 \triangleq \int_0^L \left(\mathbf{R}^\mathsf{T} P(\mu x) \mathrm{diag}\left[\Lambda'(\mathbf{R})\mathbf{R}_x\right] \mathbf{R} \right) dx.$$

13. Page 141, "diag" is missing from the right-hand side of equation (4.86). The corrected equation (4.86) is:

$$\mathbf{R}_{tt} = \Lambda(\mathbf{R})(\Lambda(\mathbf{R})\mathbf{R}_x)_x + \mathrm{diag}\left[\Lambda'(\mathbf{R})(\Lambda(\mathbf{R})\mathbf{R}_x)\right] \mathbf{R}_x.$$

14. Page 161, line 7. The minus sign is misplaced. The correct writing is:

$$-\mathbf{W}_1 \triangleq \left[\mathbf{R}^\mathsf{T} Q(x)\Lambda(x)\mathbf{R}\right]_0^L.$$

15. Page 177, line 4. "Theorem 5.1" must be replaced by "Proposition 5.2".

16. Pages 204 and 205. Throughout Section 6.1, we assume also that $F(\mathbf{0})$ is a diagonal matrix (without loss of generality but possibly by an appropriate state transformation). This assumption should be added after line 8 of page 204.

17. Page 210, equation (6.27): "$|\mathbf{Z}||\mathbf{Z}_t|^2$" should be replaced by "$|\mathbf{Z}|^2|\mathbf{Z}_t|$" in the last term.

18. Pages 211, 212, 213, 214. Throughout the proof of Theorem 6.6, the word "diag" must be deleted (eleven times). Moreover, the notation

$$\left[\frac{\partial A}{\partial \mathbf{Z}}(\mathbf{Z}, x)\mathbf{Z}_t\right]$$

stands for the matrix where the i, j entry is $(\partial A_{ij}(\mathbf{Z}, x)/\partial \mathbf{Z})\mathbf{Z}_t$. The statement in lines 6, 7, 8 of page 211 should be modified accordingly.

19. Page 215, line -4. "exits" should be replaced by "exists".

20. Page 215, inequation (6.48). An exponent "1/2" is missing in the right-hand side. The correct inequation (6.48) is:

$$|\varphi|_0 \leqslant C_1 \left(\int_0^L (|\varphi(x)|^2 + |\varphi'(x)|^2) dx \right)^{\frac{1}{2}}. \tag{1}$$

21. Page 216, line -10. A parenthesis is missing. The correct inequation is:

$$\frac{d\mathbf{V}}{dt} = \left(-2\gamma + C_3(|\mathbf{Z}(t, .)|_0 + |\mathbf{Z}_t(t, .)|_0) \right)\mathbf{V} \leqslant -\alpha\mathbf{V}.$$

22. Page 218, line 5. Replace $Q'(x)\Lambda$ by $(Q(x)\Lambda(x))_x$ in this formula.

23. Page 218, line -4. "Perollaz" should be replaced by "Perrollaz".

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24. Page 221, line 7: replace "$\mathbf{S}_x$" by "$\mathbf{S}_\xi$".

25. Page 224, line 4. "$S_1(t, L)$" should be replaced by "$S_1^{\#}(t, L)$", such that the boundary condition is

$$S_1^{\#}(t, 0) = 0, \quad S_2^{\#}(t, L) = \gamma S_1^{\#}(t, L).$$

26. Page 224, line -6: replace "P_ξ" by "$\widetilde{P}_\xi$"

27. Page 224, last line. The "tilde" upperscript is missing. The correct coefficients are "$\tilde{p}_{01}$" and "$\tilde{p}_{10}$" respectively.

28. Page 230, line - 10. In the formula of S_f, the term $A^{5/3}$ should be at the denominator. The corrected formula is:

$$S_f \triangleq \left(\frac{Q(P(A)))^{2/3}}{\nu A^{5/3}} \right)^2.$$

29. Page 263. At the end of the first line of the proof of Proposition C.2., "$\rho(k) = |k|$" should be replaced by "$\rho_2(k) = |k|$".

30. Page 267, line - 8. Replace "K" by "$\mathbf{K}$".

31. Page 268, line 1. Replace "K" by "$\mathbf{K}$".

32. Page 280. In equation (C.98), delete "*notag*".

33. Page 302, lines 9 and 11. "Perollaz" should be replaced by "Perrollaz".