

‘Introduction to Mathematical Systems Theory: A Behavioral Approach’: Errata.

If you find errors of any kind, please let us know.

Please notice that obvious mistakes are not listed here.

November 19, 2019

1. p21, Exercise 1.3, just above ‘Prove that’: $(F, H) \in \mathbb{R}$ should be $(F, H) \in \mathbb{R}^2$.
2. p31, Section 2.3.1. At several places reference is made to Equation (2.3.1). What was meant is the first displayed formula of Section 2.3.1.
3. Lemma 2.3.9: $c_i \in \mathbb{R}^g$ should read $c_i \in \mathbb{R}^q$.
4. p62, Exercise 2.12. ‘Prove that w_k converges ...’ should read ‘Prove that w_n converges ...’
5. p90, third line of proof of Theorem 3.3.22; ‘is the zero polynomial’ should ‘is not the zero polynomial’.
6. p96, first line of (3.44). The right hand side should read:

$$e^{-t}n(e^t - 1)$$

7. p111, Exercsie 3.25. Meant was $t \geq 0$ and $t < 0$.
8. p118, in (4.7) the vector

$$\begin{bmatrix} 1 \\ 0 \end{bmatrix} \quad \text{should be} \quad \begin{bmatrix} 1 \\ C \\ 0 \end{bmatrix}.$$

9. p119, 6th line from below: reference to (4.2) should be to (4.1).
10. p141, Eq. (4.56): the numerator should apply to the second and fourth entry of the right hand side of $f(x, u)$.
11. p146, Exercise 4.9. The matrix $R(\xi)$ is wrong. The following alternative should work:

$$R(\xi) = \begin{bmatrix} 3 + 3\xi & 2 + 5\xi + \xi^2 \\ -5 + 3\xi^2 & -5 - 4\xi + 4\xi^2 + \xi^3 \end{bmatrix}.$$

12. p 177, right above Section 5.3.1: $q(\xi)$ should be $p(\xi)$.
13. p196, Exercise 5.13: in the second equation $-k_3w_2$ should be $-k_4w_2$.
14. p217, last sentence of proof of Theorem 6.4.2: $q(\xi)$ is defined as $q(\xi) = \bar{r}(\xi)b + dp(\xi)$, rather than $q(\xi) = \bar{r}(\xi)b + d$.
15. p232, Exercise 6.3, Part b. In the displayed formula, giving the relation between u and y , the bar on q_1 on the right hand side, should be deleted.
16. p233, Exercise 6.4. In the equation for Σ_2 , q_1 should be replaced by q_2 . Furthermore, the correct answer is $(\bar{p}_2(\frac{d}{dt})q_1(\frac{d}{dt}) + \bar{p}_1(\frac{d}{dt})q_2(\frac{d}{dt}))u = \bar{p}_1(\frac{d}{dt})p_2(\frac{d}{dt})y$, where $p_1(\xi) = c(\xi)\bar{p}_1(\xi)$ and $p_2(\xi) = c(\xi)\bar{p}_2(\xi)$, such that $\bar{p}_1(\xi)$ and $\bar{p}_2(\xi)$ have no common factors.

17. p234, Exercise 6.10.b. ‘What are the dynamics of w_1 if $r_{11}(\xi)$ and $r_{12}(\xi)$ are *not* coprime?’ should be: ‘What are the dynamics of w_1 if $r_{12}(\xi)$ and $r_{22}(\xi)$ are *not* coprime?’

18. p237, item (a) should read:

$$\frac{d^k}{dt^k}x = c(A^k x + A^{k-1}bu + A^{k-2}b\frac{d}{dt}u + \cdots + Ab\frac{d^{k-2}}{dt^{k-2}}u + b\frac{d^{k-1}}{dt^{k-1}}u) + d\frac{d^k}{dt^k}u.$$

19. p245, Theorem 7.2.2 (ii): root of $P(\xi)$ should be root of $\det P(\xi)$.

20. p245, Theorem 7.2.2 (iii): ‘ $P(\xi)$ has a root’ should be ‘ $\det P(\xi)$ has a root’.

21. p245, Theorem 7.2.2 (iii), if should be if and only if

22. p246, Example 7.2.3.1: The inequalities should be swapped. The system is asymptotically stable if $a > 0$ and unstable if $a < 0$.

23. p254, line 6 from top, not counting (7.17): $\frac{d}{dt^2}$ should be $\frac{d}{dt}$.

24. p255, bottom: (7.3) should be (7.4) (two times).

25. p256, top: (7.15) should be (7.4).

26. p277, Exercise 7.29: the differential equation for x_2 should be:

$$\frac{d}{dt}x_2 = -x_1 - (\alpha + x_1^2)x_2$$

27. p373. In the second line of Theorem 10.8.8 the role of w_1 and w_2 should be swapped: w_1 is output and w_2 is input.

28. p380, Exercise 10.17(e): the second ‘plus’ in (10.66) should be a ‘minus’

29. p386, bottom line: c_3 should be larger than c_2 .

30. p392, first unnumbered displayed formula, the potential energy has a factor r too much in the denominator.

31. p392, second unnumbered displayed formula, first line, left hand side should read: $\frac{d}{dt}\frac{\partial L}{\partial \dot{r}} - \frac{\partial L}{\partial r}(r, \theta, \frac{dr}{dt}, \frac{d\theta}{dt})$

32. p392, (A.15), the square in the right hand side of the second line should be deleted.