Errata Sheet For
Nonlinear Control
Updated on August 24, 2020
Please e-mail error reports to khalil@msu.edu

1. Page 11, Exercise 1.5: change "Part (b)" to "Part (c)"
2. Page 34, fourth line of Exercise 2.6: change "$\dot{x}_1$" in the second equation to "$\dot{x}_2$"
3. Page 38, Line 2 from the bottom: change "for any ε" to "for any sufficiently small ε"
4. Page 48, Line 16: To clarify what is meant by "repetition of argument," note that it is enough to consider $a < r$. Then, let $\gamma = \min_{a \le \|x\| \le r} V(x)$ and take $b < \gamma$.
5. Page 62, fourth line of Example 3.11, change "that origin is stable" to "that the origin is a stable"
6. Page 77, Last line of Lemma 4.2: change "such the" to "such that the"
7. Page 77, Definition 4.2, Fourth bullet: Insert "$\forall\ t \ge t_0 \ge 0$," in the displayed inequality.
8. Page 78, Theorem 4.2: Change the sentence "Moreover, ... satisfies" on lines 5 to 7 of the theorem to "Moreover, if $W_1(x) \ge \alpha_1(\|x\|)$, $W_2(x) \le \alpha_2(\|x\|)$, and r and c are chosen such that $B_r = \{\|x\| \le r\} \subset D$ and $c \le \alpha_1(r)$, then every trajectory starting in $\{x \in B_r \mid \alpha_2(\|x\|) \le c\}$ satisfies"
9. Page 87, Theorem 4.4: Change the sentence "Choose $c > 0$ ... satisfies" on lines 6 to 9 of the theorem to "Take $r > 0$ such that $B_r \subset D$ and suppose $\mu < \alpha_2^{-1}(\alpha_1(r))$. Then, there exists a class $\mathcal{KL}$ function β such that every trajectory starting in $\{\|x\| \le \alpha_2^{-1}(\alpha_1(r))\}$ satisfies"
10. Page 100, Exercise 4.7 (b): change "$\frac{1}{2}\|PB\|\ \|F\|$" to "$1/(2\|PB\|\ \|F\|)$"
11. Page 101, Exercise 4.11 (3): change "$\dot{x}_1 = x_2$" to "$\dot{x}_1 = -x_2$"
12. Page 116, Lines 7 and 8 of the proof: change "$V(\phi(\tau, x))$" to "$V(\phi(\tau; x))$"
13. Page 118, Exercise 5.5: assume h_2 is strictly increasing
14. Page 121: delete "input-output stability" in the beginning of the first paragraph
15. Page 124, Line 10 of example 6.1: insert "by" after "bounded"
16. Page 127, Definition 6.3: change "with $\sup_{0 \le t \le \tau} \|u(t)\| \le r$" to "and $\tau \in [0, \infty)$ with $\sup_{t \ge 0} \|u(t)\| \le r$"
17. Page 134, Last line of Theorem 6.5: insert "for each $x_0 \in R^n$" after "stable"
18. Page 137, Theorem 6.7: insert "there is $r > 0$ such that for each x_0 with $\|x_0\| \le r$," after "Then,"
19. Page 141, Line 9 of the first paragraph: change "Section 7.3" to "Section 7.2"
20. Page 145, Line 9 from the bottom: change "$\Rightarrow a x_1^3$" to "$\Rightarrow -a x_1^3$"
21. Page 152, Example 7.8: change "(7.9)" to "(7.12)" in two locations
22. Page 208, Line 4 from the bottom: change "(7.8)" to "(8.8)"
23. Pagr 209 Line 20: change "$\dot{\xi} = f_0(\eta, \xi)$" to "$\dot{\eta} = f_0(\eta, \xi)$"
24. Page 212, two lines above (9.16): change "because" to "when"
25. Page 216, Line 5: change "ϕ_2" to "ϕ_1"
26. Page 242, Line 2: change "continuous" to "locally Lipschitz"
27. Page 247, Line 8: change "$\{V_1 \le 0.0016\}$" to '$\{V_1 \le 0.0012\}$"

28. Page 247, Equation (10.17): change "$= \beta(x)G(x)s$" to "$= -\beta(x)G(x)s$"

29. Page 252, Line 3 from the bottom: change "(10.11)" to "(10.10)"

30. Page 253, Theorem 10.3: change "$x(t_0) \in \{V(x) \leq \alpha_1(r)\}$" to " $\|x(t_0)\| \leq \alpha_2^{-1}(\alpha_1(r))$"

31. Page 254, Line 2: change "(10.8)" to "(10.25)"

32. Page 255, Line 2 from the bottom: change "$w = 2x^T B^T P = 2(p_{12}x_1 + p_{22}x_2)$" to "$w = 2\hat{c}B^T Px = 2\hat{c}(p_{12}x_1 + p_{22}x_2)$". The control and simulation results remain the same by taking $\mu = 0.01\hat{c} = 0.01 \times 1.25$, which still satisfies the inequality $\mu < 0.01/0.53$.

33. Page 256, Line 13: change "$\kappa_0 = |c - \hat{c}/\hat{c}| = 0.6$" to "$|(c - \hat{c})/\hat{c}| \leq \kappa_0 = 0.6$"

34. Page 257, Line 7: change "(10.13)" to "(10.12)"

35. Page 260, Exercise 10.5: change "design locally" to "design a locally"

36. Page 289, Equation (12.17): insert "max" after "$|\tilde{x}_2| \leq$"

37. Page 293, Line 4 from the bottom: change "R^s" to "R^ℓ"

38. Page 293, Line 3 from the bottom: add ", and $\psi_1, \ldots, \psi_{\rho-1}$ satisfy the Lipschitz condition (11.29) globally" after the word "origins"

39. Page 297, Line 3: change "f_a" to "f_0"

40. Page 297, Line after (12.37): change "$u \in R$" to "$v \in R$"

41. Page 299, Line 4: change "(12.47) is" to "(12.47) are"

42. Page 300, Line after (12.52): change "$u \in R$" to "$v \in R$"

43. Page 303, Line 10: change "$\theta = 0.8$" to "$\theta_1 = 0.8$"

44. Page 306, Exercise 12.14: change "9.9(f)" to "9.9(g)"

45. Page 307, Line after (13.4): change "$D_\xi \subset R^n$" to "$D_\xi \subset R^\rho$"

46. Page 307, Second line of Assumption 13.2: change "$D\eta$" to "D_η"

47. Page 313, Last line: add "$+cu$" on the right-hand side

48. Page 315, Line 5: change "$b(\bar{\eta}, \bar{\xi}) + a(\bar{\eta}, \bar{\xi})\bar{u}$" to "$a(\bar{\eta}, \bar{\xi}) + b(\bar{\eta}, \bar{\xi})\bar{u}$"

49. Page 348, (A.53): Remove comma before J and add $L = 0.0592$

50. Page 365, Third line after (D.4): add ", for $|s| \geq \mu$,". On the next three lines, change "β_0" to "$\beta_0(1 - \kappa_0)$"

51. Page 366: Change "$f(\chi, \gamma$" to "$f(\chi, t, \gamma$" in (D.5), (D.6) and four lines under (D.6)