

Errata Sheet For
High-Gain Observers in Nonlinear Feedback Control
Updated on April 9, 2022
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1. Page 23, Line 6 of Example 2.1: Change “ $\dot{\hat{x}}_2$ ” to “ $\dot{\hat{x}}_3$ ”
2. Page 84, Lines 4 and 5 from the bottom, Change

$$\dot{V} \leq -k_4\|e\|^2 + k_5\|e\|\|\xi\|$$

with $k_4 > 5$ and $k_5 > 0$,” to

$$\dot{V} \leq -k_4\|e\|^2 + k_5\|e\|\|\xi\| + k_6\|\tilde{\theta}_a\|\|\xi\| + k_7\|\tilde{\eta}\|\|\xi\| + k_8\|\xi\|^2$$

with positive k_4 to k_8 ,”

Arriving at the corrected inequality is shown by writing $\dot{V}$ as

$$\begin{aligned} \dot{V} &= -e^T Q e - 2(e - \hat{e}) P B \tilde{\theta}^T w + 2e^T P B \Lambda_1 + \tilde{\theta}^T \Gamma^{-1} [\dot{\hat{\theta}} - \Gamma(2\hat{e}^T P B)w] \\ &\leq -e^T Q e - 2(e - \hat{e}) P B \tilde{\theta}^T w + 2e^T P B \Lambda_1 \end{aligned}$$

and then applying Lemma 4.1.

3. Page 85, Line 2: Corresponding to the previous item, change the elements of the matrix N as follows:
 - Change (2,4) and (4,2) from “ $-(\delta_9 + \sigma_1)$ ” to “ $-(\delta_9 + \sigma_1 + \alpha k_6)$ ”
 - Change (3,4) and (4,3) from “ $-\sigma_3$ ” to “ $-(\sigma_3 + \alpha k_7)$ ”
 - Change (4,4) from “ $\frac{2}{\varepsilon}(1 - \varepsilon\sigma_4)$ ” to “ $\frac{2}{\varepsilon}(1 - \varepsilon\sigma_4 - \varepsilon\alpha k_8)$ ”
4. Page 136, Line 11: Change “ $|\vartheta|$ ” to “ $\|\vartheta\|$ ”
5. Page 139: The proof of Theorem 5.4 is missing the last part where it is shown that the first component of $\bar{U}$ is $O(\mu\delta)$. The details are in reference [96].
6. Page 146, Lines 13 and 14, the right-hand sides of u and $\dot{\sigma}$: Change “ $\hat{\Lambda}\sigma$ ” to “ $\hat{\Lambda}^T\sigma$ ”
7. Page 197, Equation (6.101): Change “ $M_\rho \text{ sat}(\hat{\xi}_\rho/M_\rho)$ ” to “ $M_{\rho-1} \text{ sat}(\hat{\xi}_{\rho-1}/M_{\rho-1})$ ”
8. Page 224, Line 11: Change “=” to “ $\leq$ ”
9. Page 226, Line 6: Change “designed for system” to “designed for the system”
10. Page 273, Equation (8.120): Change “ ε ” to “ ε_1 ”
11. Page 280, Line 2: Change “ x ” to “ $\hat{x}$ ”
12. Chapter 9: Change “++” to “+” in equations (9.10), (9.14), (9.24), (9.26), and (9.71)
13. Page 281, Equation (9.15): Change “ $y(y)$ ” to “ $y(k)$ ”
14. Page 298, two lines under (9.58): Change “ $Q_1(\varepsilon)\xi(k)$ ” to “ $Q_1(\varepsilon)\eta(k)$ ”
15. Page 298, two lines under (9.58): Change “is be” to “is”
16. Page 306, line 6 from the bottom: change “ V ” to “ V_1 ” in the last two inequalities
17. Page 309, Line 2: change “ $\mathcal{Y} = \begin{bmatrix} \chi(k) \\ \zeta_s(k) \end{bmatrix}$ ” to “ $\mathcal{Y} = \begin{bmatrix} \|\chi(k)\| \\ \|\zeta_s(k)\| \end{bmatrix}$ ”
18. Page 309, Line 7: change “ $\|\chi(k)\| \leq C_1 \lambda_3^{k-k_0} \|\chi(k_0)\|$ ” to “ $\|\chi(k)\| \leq C_1 \lambda_3^{k-k_0} (\|\chi(k_0)\| + \|\zeta_s(k_0)\|)$ ”
19. Page 309, Line 10: change “ $\|\chi(k_0 T_s)\|$ ” to “ $(\|\chi(k_0 T_s)\| + \|\zeta_s(k_0 T_s)\|)$ ” twice