

## Errata

Known errors and correction as of July 17, 2010.

- Page 58 (Submitted by Kaveh Akbari Hamed): Equation (3.31) should be the following.

$$\mathcal{S} := \{(q_s, \dot{q}_s) \in T\mathcal{Q}_s \mid p_2^v(q_s) = 0, p_2^h(q_s) > 0\}.$$

- Page 63 (Submitted by Kaveh Akbari Hamed): Equation (3.57) should be the following.

$$\tilde{\Sigma} : \begin{cases} \dot{\tilde{x}} = \tilde{f}_s(\tilde{x}) + \tilde{g}_s(\tilde{x})v & \tilde{x}^- \notin \mathcal{S} \\ \tilde{x}^+ = \tilde{\Delta}(\tilde{x}^-) & \tilde{x}^- \in \mathcal{S}, \end{cases}$$

- Page 67 (Submitted by Hae Won Park): Equation (3.67) should be the following.

$$\begin{aligned} (C_s(q, \dot{q}))_{1,2} &= -\frac{1}{2}mr^2 \sin(\theta_1 - \theta_2)\dot{\theta}_2 \\ (C_s(q, \dot{q}))_{1,3} &= M_T r \ell \sin(\theta_1 - \theta_3)\dot{\theta}_3 \\ (C_s(q, \dot{q}))_{2,1} &= \frac{1}{2}mr^2 \sin(\theta_1 - \theta_2)\dot{\theta}_1 \\ (C_s(q, \dot{q}))_{3,1} &= -M_T r \ell \sin(\theta_1 - \theta_3)\dot{\theta}_1 \end{aligned}$$

- Page 93 (Submitted by Kaveh Akbari Hamed): In item (e), “ $\varphi^+(t) := \lim_{\tau \nearrow t} \varphi(\tau)$ ” should be “ $\varphi^-(t) := \lim_{\tau \nearrow t} \varphi(\tau)$ ”.
- Page 95 (Submitted by Kaveh Akbari Hamed): On the first line, “ $\mathcal{X}_2$ ” should be “ $\mathcal{X}_1$ ”.
- Page 107 (Submitted by Kaveh Akbari Hamed): The following hypothesis should be added to list of hypotheses for Proposition 4.3:
  5.  $\mathcal{Z}_{(\alpha \rightarrow \beta)}$  is forward invariant and continuously finite-time attractive under  $f_{(\alpha \rightarrow \beta)}$ .
- Page 147 (Submitted by Kaveh Akbari Hamed): In Table 6.1, “0.813” should be “0.662”.
- Pages 153,154: NEC2, NEC4, and NEC5 should be NIC4, NIC5, and NIC6, respectively.
- Page 158 (Submitted by Thomas Schauss): Equation (6.67) should be the following.

$$\left[ L_{\tilde{g}} L_{\tilde{f}} h(\tilde{q}) \right]^{-1} = I_{(N-1) \times (N-1)} - \frac{1}{\det(L_{\tilde{g}} L_{\tilde{f}} h)(\tilde{q})} \frac{\partial h_d(\theta)}{\partial \theta} \tilde{J}^{\text{norm}}(q_b).$$

- Page 158 (Submitted by Thomas Schauss): Equation (6.68) should be the following.

$$\left[ L_{\tilde{g}} L_{\tilde{f}} h(\tilde{q}) \right]^{-1} = \mathbf{I}_{(N-1) \times (N-1)} - \left( \frac{1}{\tilde{d}_{N,N}(q_b) + \left[ \tilde{d}_{N,1}(q_b), \dots, \tilde{d}_{N,(N-1)}(q_b) \right] \frac{\partial h_d(\theta)}{\partial \theta}} \right) \left( \frac{\partial h_d(\theta)}{\partial \theta} \left[ \tilde{d}_{N,1}(q_b), \dots, \tilde{d}_{N,(N-1)}(q_b) \right] \right).$$

- Page 195 (Submitted by Amine Kamel): Equation (7.9) should be the following.

$$\begin{bmatrix} \alpha_0 \\ \theta_{\alpha}^+ \end{bmatrix} = H R H^{-1} \begin{bmatrix} \alpha_M \\ \theta_{\alpha}^- \end{bmatrix}$$

- Page 242: “10.1 W” should be “40.4 W”
- Page 245: “8.9 W” should be “35.6 W”
- Page 398 (Submitted by Kaveh Akbari Hamed): Equation (B.83) should be the following.

$$\tilde{f}^*(\eta, z) = \begin{bmatrix} \tilde{f}_1^*(\eta_1) \\ \vdots \\ \tilde{f}_m^*(\eta_m) \\ \tilde{f}_{r+1}(\eta, z) \\ \vdots \\ \tilde{f}_n(\eta, z) \end{bmatrix}$$

- Page 398 (Submitted by Kaveh Akbari Hamed): Equation (B.85) should be the following.

$$\tilde{f}^* \Big|_{\mathbf{z}}(z) = \begin{bmatrix} \tilde{f}_{r+1}(0, z) \\ \vdots \\ \tilde{f}_n(0, z) \end{bmatrix}$$

- Page 431 (Submitted by Hae Won Park): Equation (B.204) should be the following.

$$\bar{D}(\bar{q}) = \left( \frac{\partial F(q)'}{\partial q} \right)^{-1} D(q) \left( \frac{\partial F(q)}{\partial q} \right)^{-1} \Big|_{q=F^{-1}(\bar{q})}$$

- Page 432 (Submitted by Noah Cowan): Equation (B.211) should be the following.

$$\Gamma = \begin{bmatrix} - \left( \frac{\partial \lambda(q_1)}{\partial q_1} \right)' \\ \mathbf{I} \end{bmatrix} u^*(q, \dot{q}),$$

- Page 432 (Submitted by Noah Cowan): Equation (B.212) should be the following.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} x_2 \\ D^{-1}(x_1) \left( -C(x_1, x_2)x_2 - G(x_1) + \begin{bmatrix} - \left( \frac{\partial \lambda(q_1)}{\partial q_1} \right)' \\ \mathbf{I} \end{bmatrix} u^*(x_1, x_2) \right) \end{bmatrix}.$$

- Page 432 (Submitted by Kaveh Akbari Hamed): Equation (B.214) should be the following.

$$D(q_1, q_2) = \begin{bmatrix} D_{11}(q_1, q_2) & D_{12}(q_1, q_2) \\ D'_{12}(q_1, q_2) & D_{22}(q_1, q_2) \end{bmatrix}$$

- Page 432 (Submitted by Noah Cowan): Equation (B.216) should be the following.

$$\Gamma \cdot \dot{q} = \left( \left[ \begin{array}{c} - \left( \frac{\partial \lambda(q_1)}{\partial q_1} \right)' \\ \text{I} \end{array} \right] u^* \right)' \dot{q} = (u^*)' \frac{d}{dt} (q_2 - \lambda(q_1)),$$

- Page 438 (Submitted by Oscar E. Ramos Ponce): Equation (B.234b) should be the following.

$$(G_s(q_1, q_2))_2 = \left( m_1 g_0 L_2 + m_2 g_0 \ell_{\text{cm},2}^h \right) \cos(q_2) + m_1 g_0 \ell_{\text{cm},1}^h \cos(q_1 + q_2),$$

- Page 441 (Submitted by Kaveh Akbari Hamed): On the second line of Section C.1.4, “ $T_I(x) < \infty$ ” should be “ $T_I(\Delta(x)) < \infty$ ”.
- Page 445 (Submitted by Kaveh Akbari Hamed): Equation (C.25) should be the following.

$$\mathcal{D}T_I^\epsilon(\hat{\Delta}(z_{2:k}^*, \eta^*)) = -(L_{f^\epsilon} H(x^*))^{-1} \frac{\partial H}{\partial x}(x^*) \Phi^\epsilon(t^*, \hat{\Delta}(z_{2:k}^*, \eta^*)).$$