# Model Predictive Control: Theory, Computation, and Design 2nd Edition

**Errata for Second Edition, Third Printing**

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February 21, 2023

1. Page 34, third displayed equation. Replace $\frac{1}{2}\,|x(1)-\hat{x}^-(1)|^2_{(P^-(1))^{-1}}$ with $(1/2)(|x(1)-\hat{x}^-(1)|^2_{(P^-(1))^{-1}}+d(0))$.
2. Page 34, fourth displayed equation. Replace $|x(1)-\hat{x}^-(1)|^2_{(P^-(1))^{-1}}$ with $|x(1)-\hat{x}^-(1)|^2_{(P^-(1))^{-1}}+d(0)$.
3. Page 36, ninth line from top. Change "the cost is $d$," to "the cost is $(1/2)d$."
4. Page 36, last line. Change $|x(1)-\hat{x}(1)|_{(P(1))^{-1}}$ to $|x(1)-\hat{x}(1)|^2_{(P(1))^{-1}}$
5. Page 46, fourteenth line. Change "uniqueness of the estimator" to "existence of the estimator for all measurements $y$." Thanks to Steven Kuntz of UCSB for helpful discussion of this issue.
6. Page 94, twelfth line from bottom. Change "generally polyhedral" to "often polyhedral".
7. Page 98, Proof, part (b). Change

   > The set $\mathcal{U}_N(x)$ is defined by a finite set of inequalities each of which has the form $\eta(x,\mathbf{u})\le 0$ in which $\eta(\cdot)$ is continuous. It follows that $\mathcal{U}_N(x)$ is closed.

   to

   > We first show that $\mathcal{U}_N(x)$ is closed for all $x\in\mathcal{X}_N$. By Assumption 2.2 and Proposition 2.1, the function $\phi(k;\cdot)$ is continuous for any $k\in\mathbb{I}_{\ge 0}$. Since $\mathbb{Z}$ and $\mathbb{X}_f$ are closed by Assumption 2.3, any sequence $((x,\mathbf{u})_i)\in\mathbb{Z}_N$ that converges to, say, $(\tilde{x},\tilde{\mathbf{u}})$ satisfies $(\phi(k;\tilde{x},\tilde{\mathbf{u}}),\tilde{u}(k))\in\mathbb{Z}$ for all $k\in\mathbb{I}_{0:N-1}$, and $\phi(N;\tilde{x},\tilde{\mathbf{u}})\in\mathbb{X}_f$. Hence $(\tilde{x},\tilde{\mathbf{u}})\in\mathbb{Z}_N$ so that $\mathbb{Z}_N$ is closed. It follows from (2.5) that $\mathcal{U}_N(x)$ is closed for all $x\in\mathcal{X}_N$.

   Thanks to Xiyao Liu of Northwestern Polytechnical University, Xi'an, China, for pointing out this erratum.
8. Page 117, seventh line from bottom. Replace "$V_N^0(x)\le$" with "$V_N^0(x^+)\le$". Thanks to Xiyao Liu of Northwestern Polytechnical University, Xi'an, China, for pointing out this erratum.
9. Page 162, second line from bottom. Change $Q$ to $-Q$. Thanks to Koty McAlister of UCSB for pointing out this erratum.
10. Pages 209–210. State constraints should not have been included in the inherent robustness discussion. The following corrections repair this error. Thanks to Farshid Asadi of Southern Methodist University for pointing out this erratum.





   (a) Page 209, tenth line from bottom. Replace "state and control constraints" with "control constraints".
   (b) Page 209, ninth line from bottom. Delete "$x(i)\in\mathbb{X}$".
   (c) Page 209, eighth line from bottom. Change first two sentences to: "The set $\mathbb{U}$ is compact and contains the origin in its interior."
   (d) Page 210, Equation (3.10). Delete ", $\bar{\phi}(i:x,\mathbf{u})\in\mathbb{X}$" and "$\subset\mathbb{X}$".
   (e) Page 210, 13th line from bottom. Replace "control, state, and terminal constraints" with "control and terminal constraints"
   (f) Page 210, eighth line from bottom. Delete "$\in\mathbb{X}$".
11. Page 212, sixth line. Change "(see Appendix A.11)" to "(Rockafellar and Wets, 1998, Exercise 1.19)."
12. Page 212, 11th line from bottom. Change $V_f(x^0(N;x))$ to $V_f(x^0(N;x^+))$. Thanks to Zhigang Luo of Beihang University, China, for pointing out this erratum.
13. Page 225, third displayed equation, change $A^j$ to $A^{i-1-j}$. Thanks to Marco Kötter of the Technical University of Munich for pointing out this erratum.
14. Page 274, lines 2, 6 and 16. Replace $x_0$ with $\overline{x}_0$.
15. Page 287, lines 8-9, and page 298, first line of footnote. Change Theorem 3.15 to Theorem 3.16.
16. Page 301, second displayed equation. Change $k_1 p_A$ to $k_1 p_A^2$. Thanks to Julian Schiller of Leibniz University Hannover for pointing out this erratum.