

Predictive Control with Constraints

ERRORS DISCOVERED SO FAR

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Page xiii ‘Downloadable solution’s manual’ should be ‘Downloadable solutions manual’.

Page 12 There is an error in equation (1.23) in the book. Since the free response $\hat{y}_f(k+P_i|k)$ is defined to be the response when the input remains at its last value, namely $u(k-1)$, each term in (1.23) involving an input value $\hat{u}(k+j|k)$ should in fact involve the difference $\hat{u}(k+j|k) - u(k-1)$. Thus the correct expression for (1.23) is:

$$\begin{aligned} \hat{y}(k+P_i|k) = & \hat{y}_f(k+P_i|k) + H(P_i)[\hat{u}(k|k) - u(k-1)] + \\ & H(P_i-1)[\hat{u}(k+1|k) - u(k-1)] + \dots \\ & H(P_i-H_u+2)[\hat{u}(k+H_u-2|k) - u(k-1)] + S(P_i-H_u+1)[\hat{u}(k+H_u-1|k) - u(k-1)] \end{aligned}$$

Subsequent expressions are correct.

Page 47 Last line of Example 2.4: The dimensions given of matrices E and F are wrong. They should be 16×9 in each case. The dimensions given for the matrix G are correct.

Page 70 Exercise 2.3: The formula for the gradient is not (2.19), but the formula for ∇V which appears at the end of Mini-Tutorial 1.

Page 70 Exercise 2.4: The question should refer to Example 2.3, not Example 2.4. (But the reader could answer the question for Example 2.4 too; it is a bit more complicated.)

Page 72 Exercise 2.12: Not really an error, but the solution to this exercise will probably be clearer after reading sections 3.1 and 3.2 in the next chapter.

Page 73 Exercise 2.15(b): Actually it is much easier to design the state observer by hand than by using the *Model Predictive Control Toolbox* in this case. But you need to use the *Toolbox* representation of the model in order to perform the simulation in (c) using the *Toolbox*.

Pages 79 and 81 Figures 3.1 and 3.2: The signal labelled $\Delta(k)$ should be labelled $\Delta u(k)$ (as in Figure 3.3).

Page 105 Exercise 3.4: The reference to equation (2.23) is incorrect. It should be to equation (2.66). (I suppose this should have been a Chapter 2 exercise really.)

Page 106 Exercise 3.10: The reference to equation (3.4) is spurious. The question should read: ‘Check that the optimization problems (3.88) and (3.90)–(3.91) are standard QP problems.’

Page 215 Exercise 7.5(c): The parameter value $H_p = 30$ is too low; this value gives instability. Use $H_p = 60$ instead.

Page 226 After ‘**2. Control:**’ K_{LQ} should be K_∞ (twice) to make it consistent with Figure 8.3.

Page 319 Table C.1: The *Model Predictive Control Toolbox* parameters **ywt** and **uwt** correspond to $Q(i)^{1/2}$ and $R(i)^{1/2}$, respectively (that is, to S_Q and S_R in section 3.1.2).