

**Known Errors in  
Discrete Inverse and State Estimation Problems**

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(Special thanks to Dr. Kang Heung Ji, and to several others who communicated these.)

P. 11. The reference to Eq. (6.1) should be to Eq. (1.20)

P. 14 The reference to Eq. (4.35) should be to Eq. (1.26)

P31 line 15: “true estimate” should be “true value”

P. 37 The 2 in the numerator of Eq. (2.61) should be omitted, and  $\sigma^2$  in the exponent should be  $2\sigma^2$ . Thus the equation should be,

$$p_{r,\phi}(R, \Phi) = \frac{R}{2\pi} \frac{1}{\sigma^2} \exp(-R^2/2\sigma^2), \quad 0 \leq r, \quad -\pi \leq \phi \leq \pi$$

P60 line 13:  $M + i = 1, 2, \dots, N$  should be  $i = M + 1, M + 2, \dots, N$ .

P. 60 Eq. 2.148 should be  $\mathbf{q} = \mathbf{A}_1^{-1}(\mathbf{b} - \mathbf{A}_2\mathbf{r})$

P. 63  $\mathbf{y}$  should be  $\mathbf{b}$

P68 Eq. 2.182:  $= \mathbf{x}$  should be taken out.

P71 line 10: “sidelobes)” should be “sidelobes” without a parenthesis.

P74 2.204:  $K + i = 1, 2, \dots, M$  should be  $i = K + 1, K + 2, \dots, M$ .

P74 2.205:  $K + i = 1, 2, \dots, M$  should be  $i = K + 1, K + 2, \dots, M$ .

P74 line 29:  $K + i = 1, 2, \dots, M$  should be  $i = K + 1, K + 2, \dots, M$ .

P75 2.212:  $i > K + 1$  should be  $i > K$ .

P78 2.220:  $K + i = 1, 2, \dots, M$  should be  $i = K + 1, K + 2, \dots, M$ .

P80 2.233: The upper limit  $N$  on the summation should be  $M$ .

P82 line 26:  $\mathbf{I}/\gamma^2$  in the left should be  $\gamma^2\mathbf{I}$ .

P83 line 6: Remove 0 at the end, or the upper limit  $K$  on the summation would be  $M$ .

P87 line 9: “a sum of” should be “a linear combination of.”

P90 line 13: “and right multiply it by  $\mathbf{V}^T$ ” should be taken out.

P92 2.293:  $\alpha$  in the first term in the second line should be in bold face.

P92 2.293:  $\mathbf{Q}_G^T$  should be  $\mathbf{Q}_v^T$ .

P104 line 11:  $K' + i = 1, 2, \dots, K$  should be  $i = K' + 1, K' + 2, \dots, M$ .

P. 106, 107. The uncertainty should be in terms of  $\mathbf{V}\Lambda^{-2}\mathbf{V}^T$  rather than  $(\mathbf{E}\mathbf{E}^T)^{-1}$

P117 line 28:  $W = \gamma^2 I, S = I$  should be  $W = I, S^{-1} = \gamma^2 I$ .

P. 128 The first term of the 3rd line of Eq. (2.393) should be  $\mathbf{B}\langle\mathbf{y}\mathbf{y}\rangle\mathbf{B}^T$ .

P. 138 In the first displayed equation of the example, replace  $y(1) - y(2)$  by  $y(2) - y(1)$ .

P140 line 1:  $\mathbf{E}(1)$  should be  $\mathbf{E}(2)$ .

P140 line 29: “a recursive estimation procedure” should be “a recursive minimum variance estimation procedure.”

P. 141 In the first line of Eq. (2.442), the  $-\mathbf{x}$  term was omitted, so that it should read instead as,

$$= \left\langle (\mathbf{L}_a (\tilde{\mathbf{x}}_a - \mathbf{x}) + (\mathbf{I} - \mathbf{L}_a) (\tilde{\mathbf{x}}_b - \mathbf{x})) (\mathbf{L}_a (\tilde{\mathbf{x}}_a - \mathbf{x}) + (\mathbf{I} - \mathbf{L}_a) (\tilde{\mathbf{x}}_b - \mathbf{x}))^T \right\rangle$$

P146 2.455:  $u(\xi)v(\xi, \xi_0)$  should be  $u(\xi)\delta(\xi_0 - \xi)$ .

P147 2.458:  $\frac{d}{d\xi}$  in the first term on the left-hand side should be erased.

P147 2.458:  $u \frac{\partial^2 v(\xi, \xi_0)}{\partial \xi^2}$  in the second term on the left should be  $v \frac{\partial^2 u(\xi, \xi_0)}{\partial \xi^2}$ .

P147 2.461:  $+uv|_0^L$  should be  $-uv|_0^L$ .

P166 line 1: 2.265 should be 2.264.

P198 line 24: “Fig. 4.4” should be “Fig. 4.5.”

P199 line 22: “Q is multiplied by a large factor to make it visible.” is not necessary.

P200 line 2: “Fig. 4.3” should be “Fig. 4.4.”

P203 line 4: “Eq. 4.50” should be “Eq. 4.49.”

P215 line 34: “4.71” should be “4.70.”

P220 4.112:  $\boldsymbol{\mu}(t_f)$  in the first line and  $\mathbf{A}^{(t_f)T}$  in the second line should be  $\boldsymbol{\mu}(t_f - 1)$  and  $\mathbf{A}^{(t_f-1)T}$ , respectively.

P225 last line:  $\mathbf{u}(t) = -[\mathbf{x}(t+1) - \mathbf{x}(t)]$  should be  $\mathbf{u}(t) = \mathbf{x}(t+1) - \mathbf{A}\mathbf{x}(t)$ .

P226 4.126:  $\mathbf{Q}(t)^{-1}$  in the second line should be  $\mathbf{Q}(t-1)^{-1}$

P226 4.127:  $-\mathbf{Q}(t-1)^{-1}$  should be  $-\mathbf{Q}(t)^{-1}$ .

P232 line 11: “Can controls can be” should be “Can controls be.”

P236 line 17: 4.156 should be 4.157.

P239 4.163: The tilde over  $\mathbf{x}_0$  in the first line should be omitted.

P240 line 13: 4.156 should be 4.157.

P. 240 Eq. (4.164) Delete  $\mathbf{\Gamma}^T$

P241 line 36: 4.156 should be 4.157.

P266 line 11:  $\mathbf{R} = \text{diag}([1, 0])$  should be  $R = 1$ .

P271 5.19 should be  $\hat{\mathbf{x}}(s) = (\mathbf{I} - e^{-2\pi i s} \mathbf{A})^{-1} \hat{\mathbf{q}}(s)$  with subsequent redefinition of the resolvent.

P274 line 10:  $\mathbf{N}_1 = \mathbf{Q}$  should be  $\mathbf{N}_1 = \mathbf{B}_1$ .

*Please report further errors to [cwunsch@mit.edu](mailto:cwunsch@mit.edu)*