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Torsten Söderström: Discrete-Time Stochastic Systems, second edition, Springer-Verlag, 2002.

Below, pa.b denotes page a, line b (pa.b- denotes page a, line b from below).

Errata

p26 A more unambiguous formulation of Exercise 2.4 is the following.

Let v and e be two random vectors of zero mean that are jointly Gaussian. Let e have a positive definite covariance matrix. Show that there exist a unique matrix B and a random vector w such that

(i) $v = Be + w$

(ii) e and w are independent

p114 A more unambiguous formulation of Exercise 4.1 is the following.

Give a simple example of two stochastic processes, say $y_1(t)$ and $y_2(t)$, that fulfil the following:

(i) The first and all second order moments are the same, that is

$$\begin{aligned} &\mathbf{E}\, y_1(t) = \mathbf{E}\, y_2(t) \\ &\mathbf{E}\, y_1(t)y_1(t+\tau) = \mathbf{E}\, y_2(t)y_2(t+\tau) \quad \text{all } \tau \end{aligned}$$

(ii) The realizations (outcomes) of $y_1(t)$ and $y_2(t)$ look significantly different. From a measured data record $y(1), y(2), \ldots, y(N)$, it should be possible to tell if $y_1(t)$ or $y_2(t)$ is observed.

p134 A more unambiguous formulation of Exercise 5.1 is the following.

Let $x \sim \mathbf{N}(m_x, R_x)$ and $e \sim \mathbf{N}(0, R_e)$ be independent Gaussian random vectors. Suppose one observes

$$y = Cx + e\ .$$

(a) Determine the mean square optimal estimate of x based on the observation y.

(b) What is the covariance matrix of the estimation error? What is the covariance matrix of the estimate?

265.2 This line is missing and should read:
to let the correct model in operation have a probability close to one.

265.4- Read

$$\hat{x}(t) \triangleq \mathbf{E}\left[x(t)|Y^t\right] = \int x(t)p(x(t)|Y^t)\ \mathrm{d}x(t)$$

268.5- Read

$$\hat{x}(t) = \mathbf{E}\left[x(t)|Y^{t-1}\right]$$

268.4-, 3-, 1- Replace N by M, totally 6 times.

p367.6 Read (c) $p_{\eta|\xi=x}(y) = \gamma(y; 2 - 2\rho + 2\rho x, 4 - 4\rho^2)$

p368.10 The answer to Exercise 4.19, last line should read

$$H^{(2)} = \begin{pmatrix} H^{(1)} & I \end{pmatrix},\ R_2^{(2)} = 0.$$

p368.8- The answer to Exercise 5.1 should read:

(a) $(x|y) \sim \mathbf{N}(\hat{x}, P), \qquad \hat{x} = m_x + R_x C^T (C R_x C^T + R_e)^{-1}(y - C m_x)$.

(b) $\mathrm{cov}(x - \hat{x}) = P = R_x - R_x C^T (C R_x C^T + R_e)^{-1} C R_x$,
$\mathrm{cov}(\hat{x}) = \mathrm{cov}(x) - P = R_x - P = R_x C^T (C R_x C^T + R_e)^{-1} C R_x$.