Errata list to
Stationary stochastic processes for scientists and engineers

August 27, 2019

Below is a list of clarifcations/corrections/typos found so far:

- page xv, line 5^-: GARSH should by GARCH.
- page xv, line 3^-: Wierner should be Wiener.
- page 25, line 12^-: The second line in the formula for $r(t,t)$ is quite correct, but a more logical way to order the four terms is

$$= \mathsf{V}[U_t] + 0.5 \cdot \mathsf{C}[U_t, U_{t-1}] + 0.5 \cdot \mathsf{C}[U_{t-1}, U_t] + 0.5^2 \cdot \mathsf{V}[U_{t-1}]$$

- page 34, line 5^+ Theorem 2.2: Should be $\quad c.\ r(-\tau) = r(\tau)$,
- page 36, line 8^+: $\phi = 0$. should be $\phi = \pi/2$.
- page 44, line 1^+ in the text and line 2^+ in the figure caption: $X_{t+1} = 0.9X_t + e_t$ should be $X_{t+1} = 0.9X_t + e_{t+1}$
- page 44, line 1^- in the text: $X_{t+1} = -0.9X_t + e_t$ should be $X_{t+1} = -0.9X_t + e_{t+1}$
- page 48, line $9-10^+$: Should be

  "However, if the process is strictly stationary, all the variables have the same distribution and hence also the same expectation."
- page 51, line 5^+: Last summation, $\sum_{k=1}^{n+t}$ should be $\sum_{k=1}^{n-t}$
- page 57, line 7^+: Step 1 in the simulation from covariance function works both for stationary and for non-stationary Gaussian processes; e.g.

$$\Sigma(n) = \begin{pmatrix} r(1,1) & r(1,2) & \dots & r(1,n) \\ r(2,1) & r(2,2) & \dots & r(2,n) \\ \vdots & \vdots & \ddots & \vdots \\ r(n,1) & r(n,2) & \dots & r(n,n) \end{pmatrix}$$

- page 61, exercise 2.15, $\tau = 0,\ 1, \dots$ should be $\tau = 0,\ \pm 1, \dots$
- page 61, exercise 2.16, second line: Should be known variance σ^2, and correlation function $\rho(\tau) = 0.5^{|\tau|}$.
- page 66, line 8^-: $\mathrm{d}[\widehat{\lambda}_T]$ should be $d[\widehat{\lambda}_T]$ (two occasions)
- page 67, line 1^+: Should read

  "t if and only if no event eccurs in the interval $[0,t]$. We conclude, from the"

- page 76, line 3^+ in Definition 3.4: Should read

  "real plane, such that the number of points in disjoint regions are statistically ..."

- page 86, line 3^+ in figure caption: "covariance function $r(\tau)$" should be "spectral densities $R(f)$".

- page 95, line 11^-: $\frac{1}{n}|Z_n(k_0/N)|^2 = na_{k_0}^2/4$.

- page 111, line 7^-: Last sentence should read

  "It will be studied in more detail in Section 8.3."

- page 116, line 6^+: Should read "By re-arranging (5.1), we get the process into its standard form,"

- page 116, Equation (5.5), $\cos 2\pi f_\tau$, should be $\cos 2\pi f\tau$,

- page 132, line 1^+: Delete the word "stock".

- page 136, line 13^-: The discrete time convolution should be

$$Y_t = \sum_{u=-\infty}^{\infty} h(t-u)X_u = \sum_{u=-\infty}^{\infty} h(u)X_{t-u}.$$

- page 137, in Definition 6.1, line 1^-: The discrete time convolution should be

$$Y_t = \sum_{u=-\infty}^{\infty} h(t-u)X_u = \sum_{u=-\infty}^{\infty} h(u)X_{t-u}.$$

- page 137, line 3^-: In the second integral the derivative of $X(t-u)$ should be written $\frac{d}{du}X(t-u)$, not $\frac{d}{\mathrm{d}u}X(t-u)$.

- page 138, line 7^+: The causal discrete time convolution should be

$$Y_t = \sum_{u=-\infty}^{\infty} h(u)X_{t-u} = \sum_{u=0}^{\infty} h(u)X_{t-u}.$$

- page 157, line $3-4^+$: The covariance symbol should be C, not C.

- page 158, line 1^-: $A_{X,X'}(f) = 2\pi|f|R_X(f)$, $\Phi_{X,X'}(f) = \pi/2$, $f \geq 0$ and $\Phi_{X,X'}(f) = -\pi/2$, $f < 0$.

- page 162, first line after Figure 6.5: In probability statement, use a round parenthesis: $\mathsf{P}(\mathsf{Y}(\mathsf{t}) \leq 4)$.

- page 167, line 4^- in Definition 7.1: the sequence $\{e_t\}$ is a **zero-mean** white noise sequence,

- page 195, line 15^+: Replace "independent" by "uncorrelated" at two places.

- page 203, line $4-5^{+}$: Delete one of the "only".
- page 204, line 9^{+}: "show to be ..." should be "shown to be ..."
- page 208, Definition 8.2: Should start "The envelope of a stationary process ..."
- page 217, line 4^{+} and 5^{-}: Schwarz'
- page 233, Example 8.11: Should be

  The Ornstein-Uhlenbeck process,

  $$X'(t) + \alpha X(t) = \sigma_0 W'(t),$$

  can be simulated in its integrated form, dividing by Δ_t,

  $$\begin{aligned}\frac{X(t) - X(t-\Delta_t)}{\Delta_t} &= -\frac{\alpha}{\Delta_t}\int_{t-\Delta_t}^{t} X(u)\mathrm{d}u + \sigma_0 \frac{W(t) - W(t-\Delta_t)}{\Delta_t} \\ &\approx -\alpha X(t) + \frac{\sigma_0}{\sqrt{\Delta_t}} N_t,\end{aligned}$$

  where N_t is a standardized normal variable, $N_t \in N(0,1)$. The Euler scheme then gives

  $$X^{(a)}(t+\Delta t) = (1-\alpha\Delta_t)X^{(a)}(t) + \sigma_0\sqrt{\Delta_t}N_t. \quad (1)$$

  The exact solution is given by (8.14) and (8.15),

  $$X^{(e)}(t+\Delta_t) = X^{(e)}(t)e^{-\alpha\Delta_t} + \sigma_0\sqrt{\frac{1-e^{-2\alpha\Delta_t}}{2\alpha}}N_t. \quad (2)$$

- page 240, Equations (9.7) (last summation), (9.8) and (9.9): $r_x(\tau)$ should be $r_X(\tau)$ in all three cases
- page 250, line 2^{-}: "... the pairwise covariance is"
- page 254, line 9^{-}: Welsh should be Welch
- page 255, line 4^{+} in figure caption: Should be (b) Bartlett method with 0%.
- page 264, line 6^{+}: Should read

  "combinations of multivariable normal variables also have a normal distribution."