Errata in Stochastic Processes, Theory for Applications

The following list of typos and errata, as of 3/25/17, will be kept up to date as new errors are found. I would greatly appreciate anyone finding errors to let me know at gallager@mit.edu.

p10, line 9 and the following equation should be:

for any disjoint events, $A_1, A_2, \dots,$ and any event B with $\Pr\{B\} > 0$,

$$\Pr\Big\{\big(\bigcup_n A_n\big) \mid B\Big\} = \sum_n \Pr\{A_n \mid B\}.$$

p31, Eq. 1.54: ...$\exp(-i2\pi\theta)$... should be ...$\exp(-i2\pi\theta x)$...

p31, Eq. 1.55: ...dx... should be ...$d\theta$...

p61, Exer. 1.11b: ...$\int_\alpha^\infty \mathsf{F}_X(x)\,dx + \int_{-\infty}^{\alpha} \mathsf{F}^{\mathsf{c}}_X(x)\,dx$... should be ...$\int_{-\infty}^{\alpha} \mathsf{F}_X(x)\,dx + \int_\alpha^\infty \mathsf{F}^{\mathsf{c}}_X(x)\,dx$...

p64, Exer. 1.22: ...$p_Y(m) = \mu^n e^{(-\mu)}/n!$... should be ...$p_Y(n) = \mu^n e^{(-\mu)}/n!$...

p68, Exer. 1.38b: ...for some $\alpha < 1$... should be ...for some α, $0 < \alpha < 1$...

p75, line 2 of Def. 2.2.3: ...rv (=1)... should be ...rv (*i.e.*, $\Pr\{X > 0\} = 1$)...

p96, line 6: ...IID... should be ...identically distributed...

p88: line 9 of Exam. 2.3.3: ...geometricly... should be ...geometrically...

p116, line 1 of Theorem 3.4.5: ...semi-definite... should be ...positive semi-definite...

p183, Figure 4.7: At the extreme right side of the figure, p_1 should be 1; also, on the self-transition above state 1, 1 should be p_1

p207, Exer. 4.20c: ...$1 + [P] + \cdots, [P^{d-1}]$... should be ...$1 + [P] + \cdots + [P^{d-1}]$...

p221, line 1: ...Using Lemma 5.3.2... should be ...Using Lemma 5.2.1...

p227, last line, ...$lim_{t\to 0} N(t)$... should be ...$lim_{t\to\infty} N(t)$...

p238, left middle part of the top displayed equation: ...1- for $p = 0.5$... should be ... 1 for $p = 0.5$...

p275, line 1 of Exer. 5.14: ...(over the limiting interval $(0, \infty)$ that... should be ...(over the limiting interval $(0, \infty)$) that...

p320, last eq. in Exer. 6.5: ...$\Pr\{T_{ji} > \infty\}$... should be ...$\Pr\{T_{ji} = \infty\}$...

p331, line 2 of final paragraph of Sec.7.2.1: ...indentically... should be ...identically...

p339, Displayed equation 8 lines from bottom should be:

$$[P(t)] = \begin{bmatrix} \frac{\mu}{\lambda+\mu} + \frac{\lambda}{\lambda+\mu}e^{-(\lambda+\mu)t} & \frac{\lambda}{\lambda+\mu} - \frac{\lambda}{\lambda+\mu}e^{-(\lambda+\mu)t} \\ \frac{\mu}{\lambda+\mu} - \frac{\mu}{\lambda+\mu}e^{-(\lambda+\mu)t} & \frac{\lambda}{\lambda+\mu} + \frac{\mu}{\lambda+\mu}e^{-(\lambda+\mu)t} \end{bmatrix} \qquad [Q] = \begin{bmatrix} -\lambda & \lambda \\ \mu & -\mu \end{bmatrix}.$$

p345, Eq. 7.50 ...$q^*_{ij} = \nu_j P^*_{ij}$... should be ...$q^*_{ij} = \nu_i P^*_{ij}$...

p421, the unnumbered eq. before 9.6: ...$Z_i^n = \sum_{j=1}^{i} U_{n-j}$... should be ...$Z_i^n = \sum_{j=0}^{i-1} U_{n-j}$...

p465, first eq.: ...$\sum_j \lambda(j) \ln \big[\mathsf{E}[X(j)]\big]$... should be ...$\ln \big[\sum_j \lambda(j)\mathsf{E}[X(j)]\big]$...

p466, line 1 of final paragraph: ...submartingale... should be ...supermartingale...

p474, line 3 of Exer. 9.2: ...$X_i - Y_{i-1}$... should be ...$Y_{i-1} - X_i$...

p486, line 1: ...log-w!ealth... should be ...log-wealth...

p486, Replace parts a, b, and c of Exer. 9.37 with: **a)** Let $Z_n = \frac{1}{n}L_n(\lambda) - \mathsf{E}[Y(\lambda)]$ and explain why $\lim_{n\to\infty} Z_n = 0$ WP1. Let $A(n_o, \epsilon) = \{\omega : |Z_n(\omega)| \leq \epsilon \text{ for all } n \geq n_o\}$. Consider an ω for which $\lim_{n\to\infty} Z_n(\omega) = 0$ and explain why $\omega \in A(n_o, \epsilon)$ for some n_o. **b)** Show that $\Pr\left\{\bigcup_{n_o=1}^{\infty} A(n_o, \epsilon)\right\} = 1$. **c)** Show that for any $\delta > 0$, there is an n_o large enough that $\Pr\{A(n_o, \epsilon)\} > 1 - \delta$. Hint: Use (1.9).

p490, Eq. 10.5: ...$\mathsf{E}\left[\boldsymbol{\xi}_{\text{MMSE}}\, \hat{\boldsymbol{X}}^{\mathsf{T}}_{\text{MMSE}}(\boldsymbol{Y})\right]$... should be ...$\mathsf{E}\left[\boldsymbol{\xi}_{\text{MMSE}}\, \hat{\boldsymbol{X}}^{\mathsf{T}}_{\text{MMSE}}(\boldsymbol{Y})\right] = 0$...

p492, Eq. 10.9: ...$[G]y$... should be ...$[G]\boldsymbol{y}$...

p501, last line of Footnote 4: ...addional... should be ...additional...

p511, Eq. 10.91: ...$\beta\mathsf{E}[Y_i]]$... should be ...$\beta\mathsf{E}[Y_i]$...

p525, line 2 of Exer. 10.6: ...$\boldsymbol{Y} = [H]\boldsymbol{X} + \boldsymbol{Z}$.... should be ...$\boldsymbol{Y} = [H]\boldsymbol{X} + \boldsymbol{Z}$ where $\boldsymbol{X}, \boldsymbol{Z}$ are independent....

p525, line 1 of Exer.10.10: ...$(\boldsymbol{X} = X_1, \dots, X_n)^{\mathsf{T}}$... should be ...$\boldsymbol{X} = (X_1, \dots, X_n)^{\mathsf{T}}$...

p526, Exer. 10.12c: ...$[K_X] = 2([K_{re} - [K_{ri}])$... should be ...$[K_X] = 2([K_{re} - i[K_{ri}])$...

p527, line 2 of Exer.10.15: ...$V_x(y)$... should be ...$v_x(y)$...

p527, lines 1, 2 of Exer. 10.16: ...$V_x(y)$... should be ...$v_x(y)$... at each appearance.