Errata:
An Introduction to Stochastic Dynamics
Cambridge University Press

Jinqiao Duan
Great Bay University, China
Emails: duan@gbu.edu.cn; duanjq@gmail.com
ORCID:
https://orcid.org/0000-0002-2077-990X
Google Scholar:
https://scholar.google.com/citations?user=KNeIeiAAAAAJ&hl=en

September 2024

Chapter 2

- P30, line 2: $\mathbb{E}\|X_n - X\|^p$
- P30, bottom: missing the conditions: $p > 1, q > 1$, and $\frac{1}{p} + \frac{1}{q} = 1$
- P31, line 5: $\sigma > 0$
- P31, line 18: $M^k(0)$
- P36, lines 19, 20, 23, 24 and 27: $\mathcal{B}(0,T) \times \mathcal{F}; (0,T) \times \Omega$
- P36, line 20: change $\mathcal{F}$ to $\mathcal{B}(0,T)$; change $\mathcal{B}(0,T)$ to $\mathcal{F}$

Chapter 3

- P51, line -5: Move $\frac{1}{\Delta t}$ to the left side
- P55, line 11: delete extra $\int_0^{+\infty}$

Chapter 4

- P65, line 8: delete extra s of $\tau_i s$
- P65, line 15: missing subscript i in τ_i
- P67, line -6: The integrand after the limit should be $f_n(t, \omega)$
- P67, line 10: change ms. to m.s. (missing dot in ms.)
- P67, line 22, at the first line of formula (4.8): change $\int_{T_0}^{T_f} f(t_i^n, \omega) dB_t$ to $\int_{T_0}^{T_f} \sum_{i=0}^{n-1} f(t_i^n, \omega) I_{[t_i^n, t_{i+1}^n)} dB_t$
- P78, line -9: delete extra s of fs
- P79, line 18, the first sentence in Example 4.13: change X^2 to X_t^2
- P86, line 8, at the end of (4.82): Delete the extra ')'.
- P88, line -3: change $f : \mathbb{R}^d \to \mathbb{R}^d$ to $f : \mathbb{R}^n \to \mathbb{R}^d$
- P89, line 1: change $f : \mathbb{R}^d \to \mathbb{R}^d$ to $f : \mathbb{R}^n \to \mathbb{R}^d$
- P89, line 3 (twice), the right hand: $x \in \mathbb{R}^n$
- P89, line 3: the second term in the right hand side should be double bar $\| \dots \|$
- P91, lines 15 and 17: in line 15 'Ito SDE system' is different from 'Stratonovich SDE' in line 17.
  Why? Any difference between 'Ito SDE system' and 'Stratonovich SDE'?
- P96, line -4: change '?' to '.'

Chapter 5

- P113, line 4: change 'ridges' to 'ridge'
- P116, line 4: change X_t to $X(t)$
- P123, line 15, between (5.81) and (5.82): $\mathbb{R}^n$
- P126, line 10, Example 5.22: change W_t to B_t
- P129, line 15, Problem 5.1: change W_t to B_t, and change W_s to B_s

- P130, line 2: Problem 5.3: change linear to nonlinear
- P131, line 3: Problem 5.8: change W_t to B_t
- P131, line 13,17: Problem 5.9: change $D = (-1, 2)$ to $D = (1, 2)$

Chapter 6

- P135, line 9, Eqn (6.3): $\phi_0(x_0) = x_0$
- P137, line 2: should be (6.6)
- P153,line 2: should be (t, ω)
- P156, line -3: $\mathbb{B}_\tau(\omega)$
- P158, line 16: change f to k
- P159, line 9: Eqn (6.62): should be $\mathbb{B}_s(\omega)$
- P160, line 5, Eqn (6.67) top: should be x^2
- P160, line 8: Eqn (6.68) inside parenthesis but before the integral sign: missing '2'.
- P172, line 19: change $\mathbf{F}$ to $\mathbf{F}(t)$
- P175, line 7: ξ_t should be ξ
- P179, line 6, Eqn (6.125): should be (ω, x^s)
- P179, line 9, the left hand side of Eqn (6.126): (ω, x^s)
- P179, line 12, the right hand side of Eqn (6.127): (ω, x^u)
- P179, line 15, the left hand side of Eqn (6.128): (ω, x^u)
- P185, line -3: change '?' to '.'

Chapter 7

- P191, lines 10 and 12: change 'cadlag' to '*càdlàg*'
- P192, line 6: change 'cadlag ' to '*càdlàg* '
- P192, line -8, add: Recall that $\mathbf{L}_t$ has a *càdlàg* modification on Ω_0 and $\mathbb{P}(\Omega_0) = 1$ (see David Applebaum book P88)

- P198, lines -5 and -9, (i) and (iii): change σ to σ^α (See David Applebaum book P35)
- P198, line -3: change $\frac{1}{2}\sigma^2$ to σ^2 (In fact, $\alpha = 2$, i.e. $\mathbf{L}_2$ corresponds to $\mathcal{N}(0, 2)$)
- P199, line 5: change $\frac{1}{2}\sigma^2$ to σ^2

  P.S. We can also change $2\sigma^2$ to σ^2 in P199 line -4 and P200 line 4, cause we need to unify the notations of Brownian motion i.e. $\mathbf{L}_2$ in chapter 7.
- P204, line 17: change $\frac{1}{2}\sigma^2$ to σ^2
- P202, Eqn (7.21), line 4 : change $(2k)!$ to $2k!$
- P203, line 10: missing c_α in three places
- P208, Eqn (7.36): change $-\check{\mathbf{L}}^\alpha_{-t}$ to $-\check{\mathbf{L}}^\alpha_{-t_-}$ (Adding the left limit for $-\check{\mathbf{L}}^\alpha_{-t}$, we will ensure the bidirectional Lévy process is left continuous with right limit.)
- P209 Remark 7.20, lines 3 and 4 : missing c_α in three places
- P209 Remark 7.20: The jumps are countable but dense in every time interval. Why? Is the dense true for one path of a sample ω or the pathes of union of ω set? Could we have a clear statement?
- P212, Fig 7.10: change C to c
- P213, Eqns (7.45) and (7.48): change $\theta_{\alpha,n}$ into -1
- P215, Eqns (7.54), (7.55) and (7.56): change g to $g(t, \omega)$
- P216, Eqns (7.57): change $X_{t\_}$ to X_t in two place.
  (Suggestion: we could change $X_{t\_}dt$ and $X_{t\_}dB_t$ to $X_t dt$ and $X_t dB_t$, respectively, for SDE with Lévy noise in Section 7.4.2)
- P217, line 6: change 'cadlag' to '*càdlàg*'
- P217, Theorem 7.26: delete 'Moreover, if ..... Eqn (7.63)'
- P217, Theorem 7.26: Modify the proof for the Theorem, because the Picard iteration can not be applied for large jumps.
- P218, lines 5, 7 and -6: change $X_{t\_}dt$ and $X_{t\_}dB_t$ to $X_t dt$ and $X_t dB_t$, respectively, to unify the notations with the suggestion given in P216, Eqns (7.57).

- P219, lines 1 and -3: change $X_{t\_}dt$ and $X_{t\_}dB_t$ into $X_t dt$ and $X_t dB_t$
- P220, line 1, and P221, line 3: change $X_{t\_}dt$ and $X_{t\_}dB_t$ to $X_t dt$ and $X_t dB_t$, respectively
- P220, Eqn (7.67), line 1: The last term of the integral, should be $\sum_{i=1}^{n} y_i \partial_i g(x)$
- P221, line 9: $\|y\| < 1$
- P221, Eqn (7.71): $\|\xi\|^2$
- P221, Hypothesis (iii): delete 'Assume that there ...and additionally'. (In fact this statement is true for all Lévy processes.)
- P221, line -5: change [145,Lemma 19.21,p328] to [145,Lemma 17.21,p328]
- P227, Eqn (7.86): where $\theta_{\alpha,1} = -1$
- P229, Fig 7.24 line 2: change '$\epsilon = 0.1 : d = 0.1$' into '$\epsilon = 0.1, d = 0.1$'
- P233, Eqn (7.96): change $|y| < 1$ into $\|y\| < 1$
- P236, line -11: change $x > 0.5$ to $x > -0.5$
- P236, line -12: change $P(x)$ to $p(x)$
- P237, Fig 7.29 line 1: change $P(X)$ to $p(x)$
- P239, Eqn (7.107): change φ to v
- P239, Eqn (7.109): change $p(x)$ into $p(x,t)$ in the first term of the right hand.
- P239, Eqn (7.110): change $f(X_{t\_})dt$ into $f(X_t)dt$
- P239, line -4: delete extra ')' in the first term '$f(x)p_x(x,t))$' of the right hand side.
- P240, lines 2, 6 and 10: $\theta_{\alpha,1} = -1$
- P240, Eqn (7.114): change $f(X_{t\_})dt$ and $\sigma(X_{t\_})dBt$ to $f(X_t)dt$ and $\sigma(X_t)dBt$, respectively

Hints and Solutions

- P257, Problem 4.2: change 'As explained in Section 4.1' to 'As explained in Section 4.4' in line 2.