CORRECTIONS TO
Linear and Nonlinear Functional Analysis with Applications
by Philippe G. Ciarlet

Note: The line of a running title is counted as line 0.

Chapter 1
Page 39, line 1 in caption of Figure 1.18-2: delete “connected”
Page 40: Replace “Lipschitz-continuous” with “dΓ-measurable”
Page 41, line 12: Replace “u, v” with “f, g”

Chapter 2
Page 47, line –8: Insert “normed” after “infinite-dimensional”
Page 69, line –1: Replace “B(x; 1)” with “B(x; ε)”
Page 86, line –2: Insert “and A ∈ L(X; Y)” after “finite-dimensional”
Page 88, line –11: Replace “Problems 2.9-1 and 2.9-2” with “Question (1) in Problem 2.9-1”

Chapter 3
Page 124, second line of the proof of Theorem 3.2-1: Insert “= X” after “X̃” and replace “x” with “x̃”
Page 130, line 4 in proof of Theorem 3.2-1: Replace “(X, ||·||_1)” with “X”
Page 130, line 5 in proof of Theorem 3.2-1: Replace “≤ ||x^k - x^ℓ||” with “= ||x^k - x^ℓ||_1”
Page 131, line –13: Insert “for all x ∈ V(x_0),” after “Consequently,”
Page 139, line –3: Replace “τ_n” with “a_n”
Page 140, line 3: Replace “τ_i” with “a_i”
Page 141, line 1: Replace “τ_i” with “a_i”
Page 153, last line in Theorem 3.7-1: Replace “||x_n - x||” with “d(x_n, x)”
Page 153, line –3: Insert “since k < 1” after “y = x”

Chapter 4
Page 174, line –17: Replace “y = 0” with “x = 0”
Page 175, line 10 in proof of Theorem 4.1-1: Replace “τ(y, x)” with “x̄(x, y)”
Page 176, line 10: Insert “nonzero” after “for any”
Page 189, line 10: Insert “pointwise” after “that”
Page 193, line 3 in Theorem 4.4-1: Insert “real” after “m × n”
Page 208, line –2: Insert “if i ≠ j” after “k(j)”
Page 210, line –9: Replace “g(θ)” with “g(θ)”
Page 213, line 12: Insert “(Problem 4.8-6)” after “only the separable case”
Page 213, line 2 in statement of Theorem 4.9-1: Delete “separable”
Page 222, line –9: Insert “∥x_n∥ = 1 for all n ≥ 1” after “that”
Page 223, line –1: Insert “=” after “∥A_2∥”
Chapter 5
Page 236, line 2: Replace “n(x) ≥ 1” with “n(x) ≥ 0”
Page 248, in Theorem 5.4-3: Replace “∥A_nf∥” with “∥A_nf − f∥”
Page 252, lines –3 and –2: Replace “sin 1/2 1/2 2 1/2 1/2 Φ” with “sin 1/2 1/2 2 1/2 1/2 Φ”
Page 253, Figure 5.5-1: the function gε should be defined on the interval [−π,π] (instead of on the interval [0,2π]), with gε(θ) := gε(−θ) if θ ∈ [−π,0]
Page 254, line 12: Replace “sin 1/2 1/2 2 1/2 1/2 Φ” with “sin 1/2 1/2 2 1/2 1/2 Φ”
Page 255, line –12: Insert “and A is convex” after “z0 ∈ A”
Page 259, lines 12–14: Replace the sentence “if a mapping... in Y” with “it is easy to construct simple examples of closed linear operators between normed vector spaces that are not continuous”
Page 262, line 5: Replace “Dom f” with “Y”
Page 289, line –15: Replace “1” with “2π”
Page 301, line 4: Replace “all the” with “most”

Chapter 6
Page 316: Replace the formula displayed on line –4 with the displayed formula: “for each multi-index α with |α| ≥ 0, supx∈K |∂αφk(x) − ∂αφ(x)| → 0 as k → ∞”
Page 322, line 1: Delete “i” in “∥v − vk i∥L1(ℝ)”
Page 322, line 3 in proof of Theorem 6.4-2: Insert a minus sign after “Ec(x) :=”
Page 324, line 9: Replace “[Δ(α + (1 − α)Ek)]” with “[Δ(αEk + (1 − α)Ek)]”
Page 325, line –13 in the denominator: Replace “δN” with “ωNδN”
Page 325, line –3: Delete “loc” in “L1 loc(U)”
Page 328, line –8: Replace “N” with “N + 1” in “(Lp(Ω))^N”
Page 329, line 21: Replace “(∫Ω |∂αv|^p d x)” with “(∫Ω |∂αv|^p d x)1/p”
Page 339, line 3: Replace “2.7” with “1.18”
Page 339, line 4: Replace “vector fields” with “functions”
Page 339, line 7: Replace “w_k” with “w_j”
Page 349, line 7: Replace “n” with “N”
Page 349, line 11: Replace “u” with “v”
Page 350, lines 13, 18, and 19: Replace “n” with “N”
Page 351, line 17: Replace “b” with “c”
Page 356, line 8: Replace “∥Δv∥0,Ω” with “∥Δv∥2 0,Ω”
Page 359, line –11: Delete “=”
Page 361, line 16: Replace “6.8-6” with “6.8-7”
Page 361, line –4: Replace “Γ” with “Ω”
Page 362, line 2: Replace “6.8-2” with “6.8-3”
Page 373, line 14: Replace “Aw_k = w_k” with “Aw_k = λ_kw_k”
Page 373, line 15: Replace “vl” with “wl”
Page 373, line –14: Replace “To” with “We next”

Page 373, line –14: Replace “\( \sqrt{\lambda_k} \)” with “\( \lambda_k^{1/2} \)”

Page 373, line –13: Insert “. To this end” after “\( (L^2(\Omega), \langle \cdot, \cdot \rangle) \)”

Page 373, line –12: Replace “\( \sqrt{\lambda_k} \)” with “\( \lambda_k^{1/2} \)”

Page 373, line –2: Insert “nonzero” after “for all”

Page 393, line –5: Replace “elliptic” with “coercive”

Page 397, line –8: Replace “Another” with “A direct, albeit delicate”

Page 397, line –4: Replace “identity mapping” with “canonical injection”

Page 399, line 19: Replace “second part; cf. Theorem 5.11-6” with “first part; cf. Theorem 5.11-5”

Page 401, line 15: Replace “\( \nu \sum_{i=1}^N H^{-1}(\Omega) \langle -\Delta u_i \rangle \)” with “\( \sum_{i=1}^N H^{-1}(\Omega) \langle -\nu \Delta u_i \rangle \)”

Page 403, line 6: Replace “adjoint” with “dual”

Page 405, line –7: Replace “identity mapping” with “canonical injection”.

Page 406, line 3: Replace

\[
\| v \|_{0, \Omega, L^2} \leq C_p(\| v \|_{1, \Omega, L^2} + \| e(v) \|_{0, \Omega, L^2})^{1, p}
\]

with

\[
\| v \|_{1, p, \Omega} \leq C_p(\| v \|_{0, p, \Omega} + \| e(v) \|_{0, p, \Omega})^{1, p}
\]


Page 420, Proof of Theorem 6.17-1, line 2: Replace “\( \pi \in C ([0, 1]; \mathbb{R}) \)” with “\( \pi \in C ([0, 1]; \mathbb{R}^N) \)”

Page 420, line –4: Replace “\( \mathbb{R} \)” with “\( \mathbb{R}^N \)”

Page 421, lines 1 and 14: Replace “\( \mathbb{R} \)” with “\( \mathbb{R}^N \)”

Page 423, line –6: Replace “\( G_j(0, \lambda) \)” with “\( G_j(1, \lambda) \)”

Page 427, line 17: Replace “\( \pi \)” with “\( \lambda \)”

Page 432, line 8: Replace “\( \gamma(t) \)” with “\( \gamma_s(t) \)”

Page 438, line –1: Replace “\( \partial_j e_{ij} \)” with “\( -\partial_j e_{ij} \)”

Page 442, line –8: Replace “\( \mathbf{e} \cdot \mathbf{s} \)” with “\( \mathbf{e} : \mathbf{s} \)”

\section*{Chapter 7}

Page 455, line 11: Insert “\( \rightarrow Y \)” before “is”

Page 459, line 11: Replace “\( f'(a) \)” with “\( f'(a)h \)”

Page 459, line 12: Replace “\( g'(b) \)” with “\( g'(b)k \)”

Page 468, line –6: Replace “\( \partial_1 f(a) - \partial_2 f(b) \)” with “\( \partial_1 f(a) - \partial_1 f(b) \)”

Page 470, line –5: Replace “\( f_m(x_0) - f_n(x_0) \)” with “\( (f_m(x_0) - f_n(x_0)) \)”

Page 500, line 13: Replace “\( f'(x) \)” with “\( f''(x) \)”

Page 501, line 14: Replace “\( h \)” with “\( s \)”

Page 501, line 15: Replace “\( \zeta \)” with “\( \xi \)”
Page 501, line 16: Insert “∥ξ∥” between “|t|” and “β(t, ξ)”
Page 502, line 19: Replace “k” with “h”
Page 504, line –1: Replace “(α1, α2, . . . , αm)” with “(α1, α2, . . . , αn)”

Chapter 8
Page 580, line 12: Replace “gi(x)” with “gj(x)”
Page 593, line 2: Delete exponent “s”
Page 593, line 3: Replace “α1, α2, . . . , αm)” with “(α1, α2, . . . , αn)”
Page 608, line 16: Replace “Rn” with “En”
Page 613, line 6: Insert “,n ≥ 2,” after “En → En”
Page 619, line 14: Replace twice “R3” with “E3”
Page 622, lines 22 and 23: Replace “ω” with “ω”
Page 623, line 15: Replace “R3” with “E3”
Page 624, line –8: Insert “simply connected” after “open”
Page 651, line 4: Delete “(i)” and “)”
Page 657, lines –11 and –10: Replace “This property is usually derived by assuming” with “Other crucial assumptions are”

Chapter 9
Page 686, line 17: Replace “(∫Ω |∇v|p)1/p dx” with “(∫Ω |∇v|p dx)1/p”
Page 705, line 4: Replace “9.5-1” with “9.7-1”
Page 708, line –5: Replace “ψ” with “φ”
Page 716, at the end of line –7: Replace “the” with “any”
Page 719, line –11: Replace “: with “ε”
Page 719, line –7: Insert “dx” after “}”
Page 723, line 5: Replace “of” with “from”
Page 731, line –2: Replace “a” with “b”
Page 737, line 5: Replace “<” with “≤”
Page 737, line 6: Replace “≥” with “>”
Page 744, line 3: Replace “∥A(v)∥” with “∥A(v)∥v”
Page 745, line –2: Insert “)” between “v” and “,”
Page 750, line –7: Replace “1 ≤ i ≤ n” with “1 ≤ j ≤ n”
Page 751, lines –3, –5, –6, –9, and –12: Replace “fη” with “fη”
Page 755, line 9: Replace “(i)” with “(ii)”
Page 760, lines 2 and 3: Replace “Vj” with “Vj”
Page 765, line 6: Replace “det” with “deg”
Page 769, line –10: Replace the second “=” with “−”