Corrections to second printing of
Numerical Methods for Least Squares Problems
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Chapter 1

p. 3, l.-16: change “and $\mathbf{V}(z) = \mu \|b\|_2$” to
“Then if $V = \sigma^2 I$ we have $\mathbf{V}(z) = \sigma^2 f^T f = \sigma^2 \|f\|_2^2$”

Chapter 2

p. 49, l.21: $\sqrt{u}$ should be: $\sqrt{1/u}$
p. 75, l.11,12: change $p$ to $r$ (4 ×)
p. 77, l. 2: should be: $T = L_{21} L_{11}^{-1}, \ldots$
p. 87, l. 12: should be: ”is to take . . .”
p. 87, l.12: should be: ”in $B^T B - \tau I$”
p. 113, l.-10: should be: $=(V_{22}^T, V_{12}^T).$”
p. 113, l.-9: should be: $\Pi = \Pi_r \tilde{\Pi} \Pi_r^T$”

Chapter 4

p. 168, l. -3: first component in $b$ should be: 3
p. 184, l. 18: should be: $|a^T_i x - b_i|^2$.
p. 186, l. 6: should be: $\sigma_1 \geq \sigma_2 \geq 0$

Chapter 5

p. 188, l.-6: should be: $Ax - b = \hat{A}_2 \hat{x}_2 - \hat{b}$.
p. 189, l. 5: should be: $\hat{A}_2 v = \hat{A}_2 v - \hat{A}_1 R_{11}^{-1} R_{12} v = 0$.
p. 203, l.17: change $E_B$ and $E_{\mathcal{F}}$ to $E_B^T$ and $E_{\mathcal{F}}^T$.
p. 203, l.20: should be: $\lambda = -U^T (d - U E_B^T x)$.
p. 205, l.-3. should be: $\psi(x, \lambda) =$
p. 208, l.15. should be: with $C = I_\mathcal{N}$ and
p. 208, l.-5. should be: is upper bidiagonal

p. 212, l.-3. should be: 
\[ P_\mu = A(A^T A + \mu^2 I_n)^{-1} A^T = \ldots \]

p. 213, l. 2 should be: 
\[ \sum_{i=1}^{n} \left( \frac{\mu^2 c_i}{\sigma_i^2 + \mu^2} \right)^2 + \ldots \]

p. 213, l. 4 should be: 
\[ = m - n + \sum_{i=1}^{n} \frac{\mu^2}{\sigma_i^2 + \mu^2} \]

p. 213, l. 7 should be: Eldén [272, 1984]

Chapter 6

p. 217, l.-15: should be: 
\[ p = \max_{i \leq i \leq n} (i - f_i(C)). \]

p. 218, l. 16: should be: 
\[ \text{Env}(C) = \{(i, j) \mid f_i(C) \leq j \leq i\}. \]

p. 225, l. 13–14: 
\[ C = \sum_{k=1}^{M} B_k^T B_k. \]

We assume in the following that . . .

p. 225, l. -10–11: Identifying the blocks in \( A^T A = R^T R \), we find that
\[ R_i^T R_i = A_i^T A_i, \quad R_i^T S_i = A_i^T B_i, \quad i = 1, \ldots, M, \]
\[ R_{M+1}^T R_{M+1} = C - \sum_{k=1}^{M} S_k^T S_k. \]

p. 246, l.-7: should be: its graph \( G(A^T A) \)

Chapter 7

p. 300, l.-10: rhs in (7.5.5) should be: 
\[ -C^T (b_2 - C b_1) \]

p. 303, l.-8: Section 2.5.1 should be: Section 2.6.2

p. 305, l. 1: change to: . . . in (7.6.2) (now with \( U_1 = (u_1, \ldots, u_{n+1}) \))

p. 309, l. 1: formula should be: 
\[ \|r_k\|_2 = \bar{\phi}_{k+1} = \beta_1 s_k s_{k-1} \cdots s_1. \]

p. 309, l. 6: Algorithm 2.3.1 should be: Algorithm 2.3.2

p. 311, l. 14: should be: 
\[ (\beta_1 e_1, B_k) = P_{k+1} \Omega_k Q_{k+1} \]

p. 311, l. 5: delete the sentence “The SVD of this matrix . . .”
Chapter 8

p. 325, l. 11: should be: matrix \( V \in \mathbb{R}^{m \times n} \)

p. 338, l. 1 should be: where \( D \in \mathbb{R}^{q \times n} \),

p. 338, l. 3: should be: \((A \otimes B)d = \text{vec}(BDA^T)\)

p. 338, l. 6: should be = \text{vec}(B^{-1}DA^{-T})

p. 338, l. 9: should be: = \text{vec}(B^1D(A^1)^T)

Chapter 9

p. 343, Example 9.2.1: The point \( x^* = 0 \) is NOT a local minimizer for \( \lambda \geq 1 \), but it always is a critical point.

p. 346, l. -1: change \(-\) to \(+\) in displayed formula

p. 346, l.-5: change \( \mu_k \) to \( \mu_k^2 \)

p. 347, l. 1, 2: should read “and for large \( \mu_k \) … steepest descent direction \(-J(x_k)^T r(x_k)\).

p. 347, l. 9: should be \(- ||r(x_k) + p_k)||_2^2 \) …

p. 349, l. 10: should be \((\Sigma^2 + V_1^T Q_k V_1) q_1 = \)

p. 349, l.-19: should be maintain \( p \) close …

p. 350, l. 17: should be \( z_k = J(x_k)^T r(x_k) - J(x_{k-1})^T r(x_k) \)

p. 350, l. 19: change \( y_k \) to \( z_k \) in equation (9.3.6)

p. 351, l. -8: should be: based on (9.4.3) …

p. 352, l. -13: should be \( B(z)y = \) …

p. 356, l. -8: change \( Q_2 \) to \( Q_1 \) in second formula.

p. 356, l. -1: change \( s_2 \) to \( s_1 \).