Applied Linear Algebra
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Corrections to Third Printing (2013)
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*** Page xxii ***
Add Jeffrey Humpherys and Sean Rostami to acknowledgments in last paragraph.

*** Page 204 *** Displayed equation in Proof of Theorem 4.16:
Middle term should be $y_k L_k(t_k)$:

$$p(t_k) = y_1 L_1(t_k) + \cdots + y_k L_k(t_k) + \cdots + y_{n+1} L_{n+1}(t_k) = y_k,$$

*** Page 283 *** Figure 5.13:
Change $x^2 - 2\pi x$ to $2\pi x - x^2$.

*** Page 284 *** Figure 5.14:
Change $x^2 - 2\pi x$ to $2\pi x - x^2$.

*** Page 377 *** Definition 7.46 is incomplete. Here is a corrected version:

**Definition 7.46.** A complex vector space $V$ is called *conjugated* if it admits an operation of *complex conjugation* taking $u \in V$ to $\overline{u} \in V$ with the following properties:

(a) conjugating twice returns one to the original vector: $\overline{\overline{u}} = u$;
(b) compatibility with vector addition: $\overline{u + v} = \overline{u} + \overline{v}$;
(c) compatibility with scalar multiplication: $\overline{\lambda u} = \overline{\lambda} \overline{u}$, for all $\lambda \in \mathbb{C}$ and $u, v \in V$.

*** Page 410 *** line 16:
Delete $T$ on formula for $S = (v_1, v_2, \ldots, v_n)$.

*** Page 438 *** Definition 8.46, first line:
Change $w_1, \ldots, w_j \in \mathbb{C}^m$ to $w_1, \ldots, w_j \in \mathbb{C}^n$.

*** Page 438 *** line -2:
Change “Thus, $w_2$ a generalized . . .” to “Thus, $w_2$ is a generalized . . .”

*** Page 448 *** Equation (9.8) and line 19:
Change $\dot{u} = A u$ to $\dot{\mathbf{u}} = A \mathbf{u}$.
Exercise 9.1.22: Change $\mathbf{u} = A\mathbf{u}$ to $\dot{\mathbf{u}} = A\mathbf{u}$.

Theorem 9.13: Change $\mathbf{u} = A\mathbf{u}$ to $\dot{\mathbf{u}} = A\mathbf{u}$.

Exercise 9.2.18: Change $\mathbf{v} = A^T\mathbf{v}$ to $\mathbf{v} = A^T\mathbf{v}$.

Exercise 9.4.15: Change $\mathbf{v} = A^T\mathbf{v}$ to $\mathbf{v} = A^T\mathbf{v}$.

Exercise 9.4.34: Change $\mathbf{u} = A\mathbf{u} + e^{\lambda t}\mathbf{v}$ to $\dot{\mathbf{u}} = A\mathbf{u} + e^{\lambda t}\mathbf{v}$.

Exercise 10.1.41: Change $x_0, x_1, \ldots$ to $u^{(0)}, u^{(1)}, \ldots$
Change the parameter $t_1$ so that the corresponding residual vector

$$r_1 = f - Ku_1 = r_0 - t_1 Kv_1$$

(10.91)
is as close to $0$ (in the Euclidean norm) as possible. This occurs when $r_1$ is orthogonal to $r_0$ (why?), and so we require

$$0 = r_0^Tr_1 = \|r_0\|^2 - t_1^Tr_0^TKv_1 = \|r_0\|^2 - t_1 \langle r_0, v_1 \rangle = \|r_0\|^2 - t_1 \langle v_1, v_1 \rangle. \quad (10.92)$$
to the parameter $t_1$ that minimizes

$$p(u_1) = p(t_1v_1) = \frac{1}{2} t_1^2 v_1^TKv_1 - t_1 v_1^Tf = \frac{1}{2} t_1^2 \langle v_1, v_1 \rangle - t_1 \|r_1\|^2. \quad (10.91)$$

Correct second and third terms in displayed formula:

$$0 = \langle v_2, v_1 \rangle = \langle r_1 + s_1v_1, v_1 \rangle = \langle r_1, v_1 \rangle + s_1 \langle v_1, v_1 \rangle,$$

Delete “as small as possible, which is accomplished by requiring it to”

Delete “as small as possible, by requiring it be”

For each eigenvalue, the computation of the corresponding eigenvector can be most efficiently accomplished by applying the shifted inverse power method of Exercise 10.6.7 with parameter $\mu$ chosen near the computed eigenvalue.

The middle expression is missing a $c$ in the denominator:

$$G(x, y) = \frac{(1 - y)x - \rho(x - y)}{c} = \begin{cases} x(1 - y)/c, & x \leq y, \\ y(1 - x)/c, & x \geq y, \end{cases} \quad (11.59)$$
Solution 2.5.5 (b):

\[ x^* = (1, -1, 0)^T, \quad z = z \left( -\frac{2}{7}, -\frac{1}{7}, 1 \right)^T; \]

Solution 8.5.1 (a):

\[ \sqrt{3} \pm \sqrt{5} \]

Solution 9.1.28 (g):

Change 
\[ \mathbf{u} = \begin{pmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ -1 & 0 & 0 \end{pmatrix} \mathbf{u} \quad \text{to} \quad \mathbf{\dot{u}} = \begin{pmatrix} 0 & 0 & 0 \\ 1 & 0 & 0 \\ -1 & 0 & 0 \end{pmatrix} \mathbf{u}. \]