Linear Algebra

Richard Kaye and Robert Wilson,
Oxford University Press, 1988.

ISBN 0 19 850238 9 (Hbk)
ISBN 0 19 850237 9 (Pbk)

This document lists all the errors (including typographical errors and misprints and two slightly more serious errors) that we are aware of at the current time. The authors would be grateful to hear from you if you discover any others. Please email us at `R.W.Kaye@bham.ac.uk`, `R.A.Wilson@bham.ac.uk`, or write to us at the School of Mathematics and Statistics, University of Birmingham, Birmingham, B15 2TT.

Example 4.13, page 67.

Replace this with the following.

Example 4.13 In the complex vector space $\mathbb{C}^2$, take ordered bases $\mathbf{a}_1, \mathbf{a}_2$ and $\mathbf{b}_1, \mathbf{b}_2$ where

$$\mathbf{a}_1 = \begin{pmatrix} 1 \\ i \end{pmatrix}, \ \mathbf{a}_2 = \begin{pmatrix} 1 \\ 1+i \end{pmatrix}, \qquad \mathbf{b}_1 = \begin{pmatrix} i \\ -i \end{pmatrix}, \ \mathbf{b}_2 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}.$$

Then the base-change matrices from the usual basis $(1,0)^T, (0,1)^T$ to $\mathbf{a}_1, \mathbf{a}_2$ is

$$\mathbf{P} = \begin{pmatrix} 1 & 1 \\ i & 1+i \end{pmatrix},$$

and from the usual basis $(1,0)^T, (0,1)^T$ to $\mathbf{b}_1, \mathbf{b}_2$ is

$$\mathbf{Q} = \begin{pmatrix} i & 1 \\ -i & 1 \end{pmatrix}.$$

This can be used to find the base-change matrix from $\mathbf{a}_1, \mathbf{a}_2$ to $\mathbf{b}_1, \mathbf{b}_2$ as follows.

If $(v_1, v_2)^T$ is the coordinate form of a vector $\mathbf{v}$ with respect to $\mathbf{b}_1, \mathbf{b}_2$, then $\mathbf{Q}(v_1, v_2)^T$ is the coordinate form of $\mathbf{v}$ with respect to the usual basis. Then $\mathbf{P}^{-1}\mathbf{Q}(v_1, v_2)^T$ is the coordinate form of $\mathbf{v}$ with respect to $\mathbf{a}_1, \mathbf{a}_2$, so the base-change matrix from $\mathbf{a}_1, \mathbf{a}_2$ to $\mathbf{b}_1, \mathbf{b}_2$ is

$$\begin{aligned} \mathbf{P}^{-1}\mathbf{Q} &= \begin{pmatrix} 1 & 1 \\ i & 1+i \end{pmatrix}^{-1} \begin{pmatrix} i & 1 \\ -i & 1 \end{pmatrix} = \begin{pmatrix} 1+i & -1 \\ -i & 1 \end{pmatrix} \begin{pmatrix} i & 1 \\ -i & 1 \end{pmatrix} \\ &= \begin{pmatrix} -1+2i & i \\ 1-i & 1-i \end{pmatrix}. \end{aligned}$$

Exercise 4.6, page 72.

The last occurrence of $\mathbf{f}_1$ should read $\mathbf{f}_3$.

p. 117, line 15

The second partial derivative should be $\partial F/\partial y$ not $\partial F/\partial x$.

p. 140, Exercise 8.4

Replace $-y + 3z$ by $-y - 2z$ in the definition of f.

p. 160, line 14

It is not true that $(\mathbf{A} - \lambda_n \mathbf{I})\mathbf{e}_n = \mathbf{0}$. In fact it is a linear combination of $\mathbf{e}_1, \ldots, \mathbf{e}_{n-1}$. Thus the induction still works, but the proof needs some slight adjustments. For example, replace the third paragraph of the proof (beginning 'Now ...') by the following:

Now $(\mathbf{A} - \lambda_n \mathbf{I})\mathbf{e}_n$ is a linear combination of $\mathbf{e}_1, \ldots, \mathbf{e}_{n-1}$. Also, the linear transformation given by $\mathbf{A}$ on the subspace span$(\mathbf{e}_1, \ldots, \mathbf{e}_{n-1})$ has upper triangular matrix with respect to this basis, with diagonal entries $\lambda_1, \ldots, \lambda_{n-1}$, so by the induction hypothesis we have

$$(\mathbf{A} - \lambda_1 \mathbf{I}) \ldots (\mathbf{A} - \lambda_{n-1} \mathbf{I})\mathbf{e}_i = \mathbf{0}$$

for all $i < n$. Thus

$$(\mathbf{A} - \lambda_n \mathbf{I})(\mathbf{A} - \lambda_1 \mathbf{I}) \ldots (\mathbf{A} - \lambda_{n-1} \mathbf{I})\mathbf{e}_i = \mathbf{0}$$

for $i < n$. Moreover,

$$(\mathbf{A} - \lambda_1 \mathbf{I}) \ldots (\mathbf{A} - \lambda_{n-1} \mathbf{I})(\mathbf{A} - \lambda_n \mathbf{I})\mathbf{e}_n$$

is a linear combination of the

$$(\mathbf{A} - \lambda_1 \mathbf{I}) \ldots (\mathbf{A} - \lambda_{n-1} \mathbf{I})\mathbf{e}_i$$

for $i < n$, all of which are $\mathbf{0}$. Therefore

$$(\mathbf{A} - \lambda_1 \mathbf{I}) \ldots (\mathbf{A} - \lambda_{n-1} \mathbf{I})(\mathbf{A} - \lambda_n \mathbf{I})\mathbf{e}_i = \mathbf{0}$$

for all $i \leq n$.

Exercise 12.8(a), page 186.

$x_{n+1} = x_n + 4x_n + 1$ should read $x_{n+1} = x_n + 4y_n + 1$.