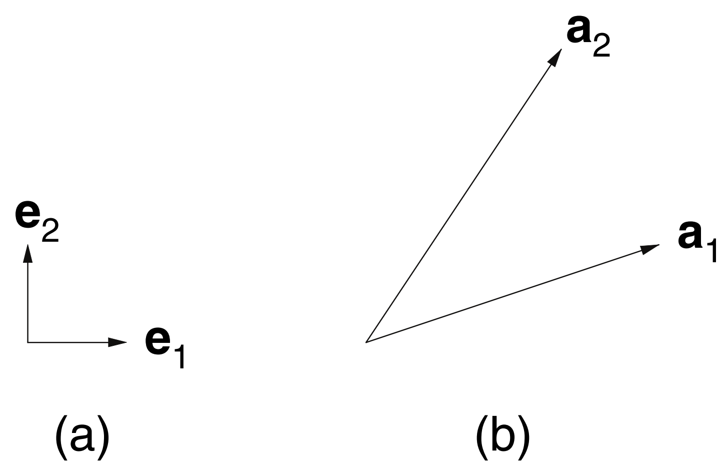

Figure 6.1: (a) The canonical basis vectors $\mathbf{e}_1$ and $\mathbf{e}_2$ of $\mathbb{R}^2$.
(b) The images $\mathbf{a}_1 = \mathbf{A}\mathbf{e}_1$ and $\mathbf{a}_2 = \mathbf{A}\mathbf{e}_2$ under the matrix $\mathbf{A}$ given in (6.48).

$$\mathbf{A} = \begin{pmatrix} 3 & 2 \\ 2 & 6 \end{pmatrix}$$

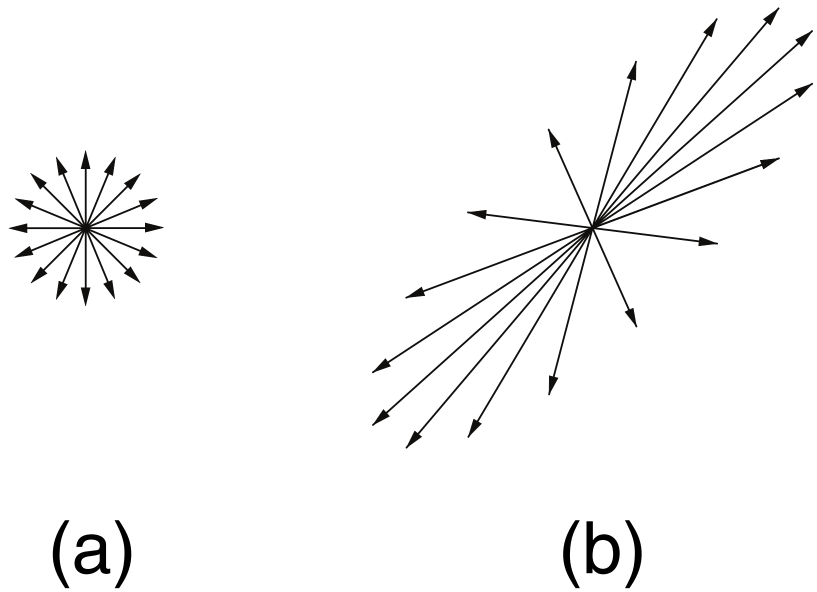

Figure 6.2: (a) A set of vectors of unit length; angular interval $= \pi/8$.
(b) The images of the vectors in (a) under the matrix $\mathbf{A}$ given in (6.48).

$$\mathbf{A} = \begin{pmatrix} 3 & 2 \\ 2 & 6 \end{pmatrix}$$

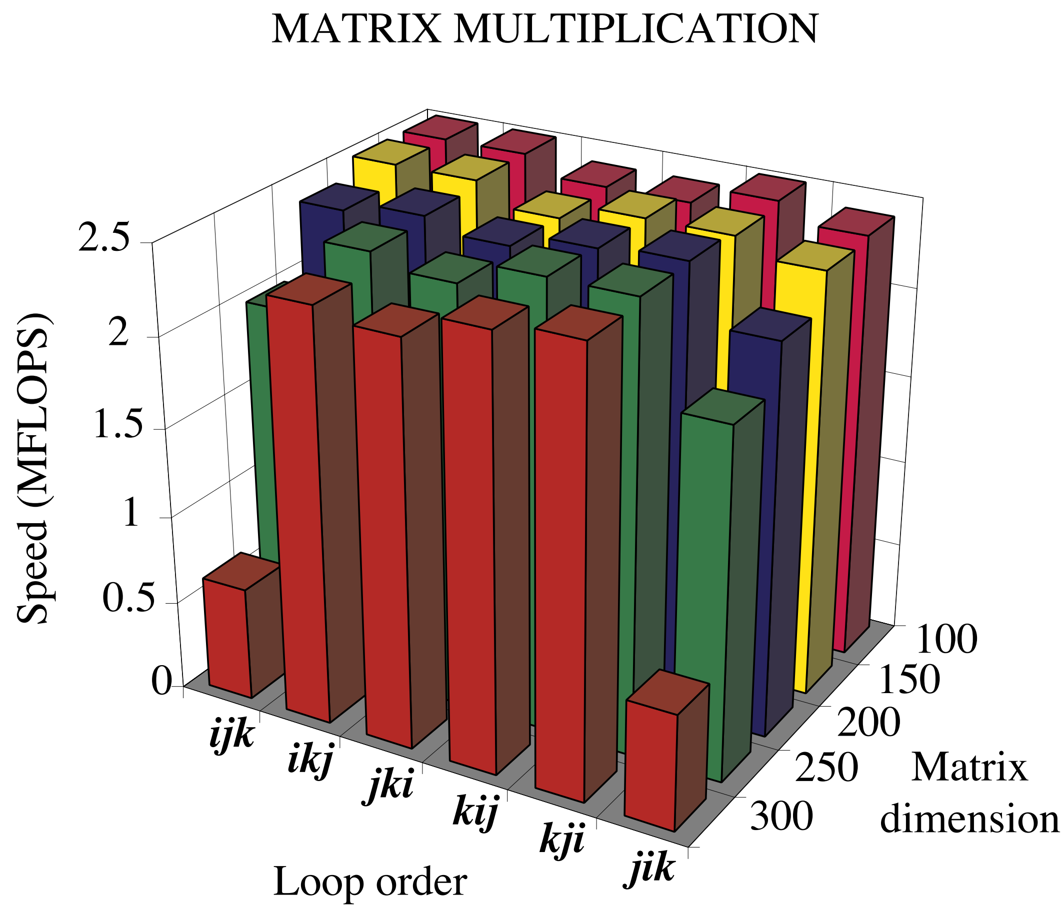

Figure 6.3: Performance of IEEE-754 double-precision FORTRAN matrix multiplication versus matrix size and loop ordering. Cache sizes: Level 1: 32 kB; Level 2: 512 kB.

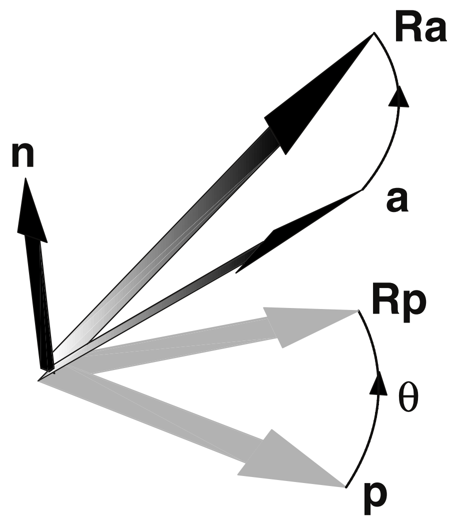

Figure 6.4: Finite rotation of a vector **a** about an axis **n**. The angle of rotation is θ. The image of **a** under the rotation is **Ra**. The orthogonal projections **p** and **Rp** of **a** and **Ra** on the plane perpendicular to **n** are shown as shadows.

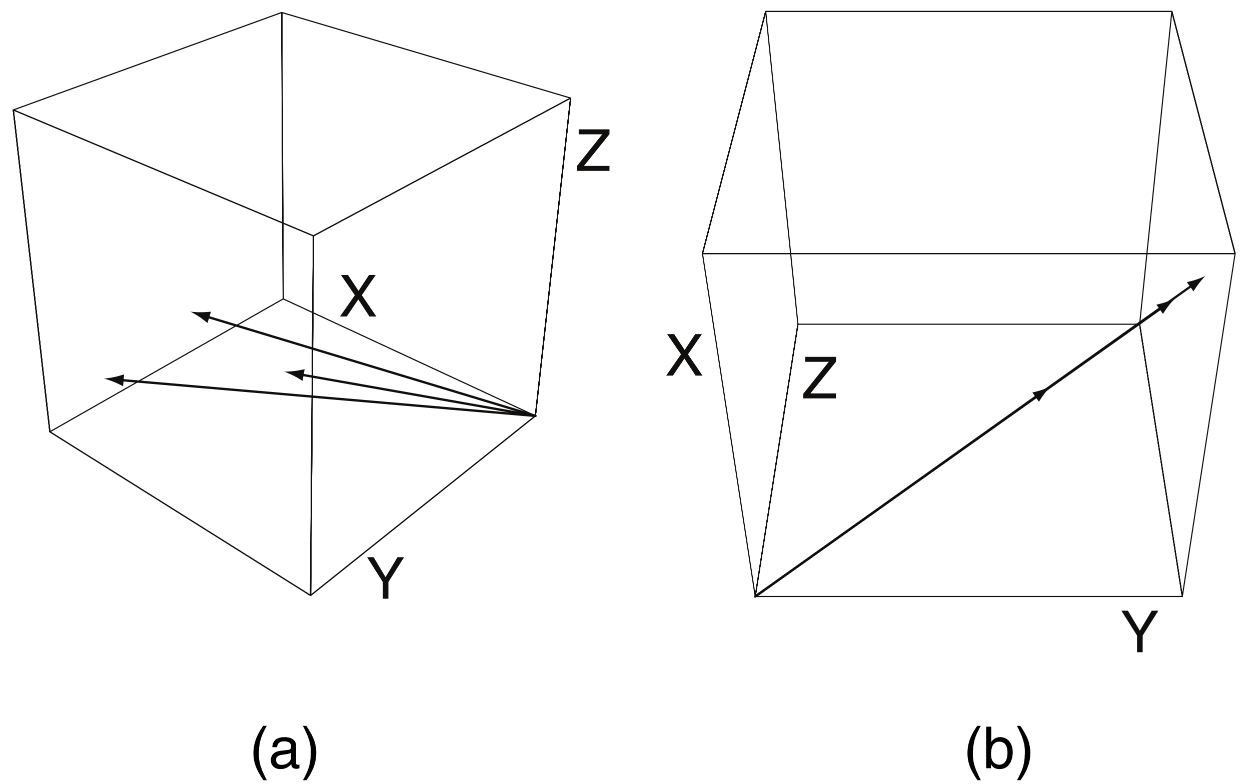

Figure 6.5: (a) Perspective view showing the three column vectors of the matrix **B** defined in Eq. (6.54). (b) Rotated view showing that the vectors lie in a common plane.

$$\mathbf{B} = \begin{pmatrix} 1 & 2 & 1 \\ 2 & 3 & 3 \\ 1 & 1 & 2 \end{pmatrix}$$

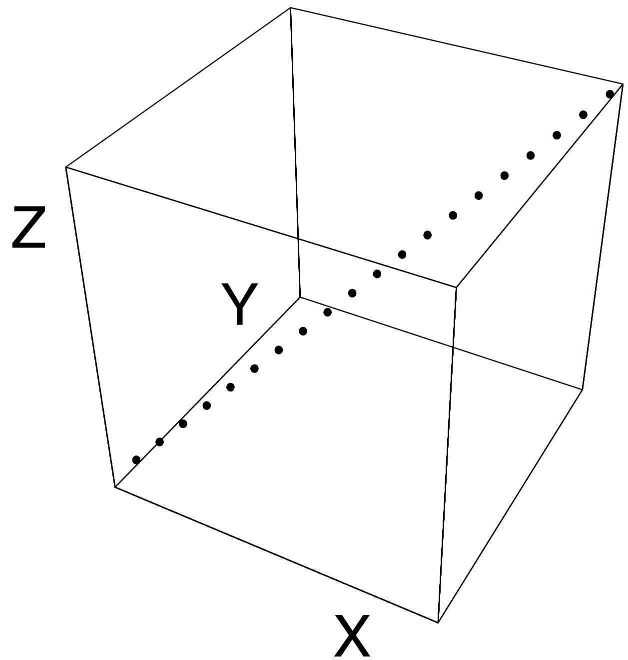

Figure 6.6: The column vectors $\mathbf{a}_1, \mathbf{a}_2, \ldots, \mathbf{a}_{20}$ of the matrix $\mathbf{A}$, plotted as points in three-dimensional space. The point closest to the lower left-hand corner of the bounding box corresponds to the vector $\mathbf{a}_1$.

$$\mathbf{A} = (\mathbf{a}_1, \mathbf{a}_2, \ldots, \mathbf{a}_{20}) = \begin{pmatrix} 1 & 4 & \cdots & 3n-2 & \cdots & 58 \\ 2 & 5 & \cdots & 3n-1 & \cdots & 59 \\ 3 & 6 & \cdots & 3n & \cdots & 60 \end{pmatrix}$$

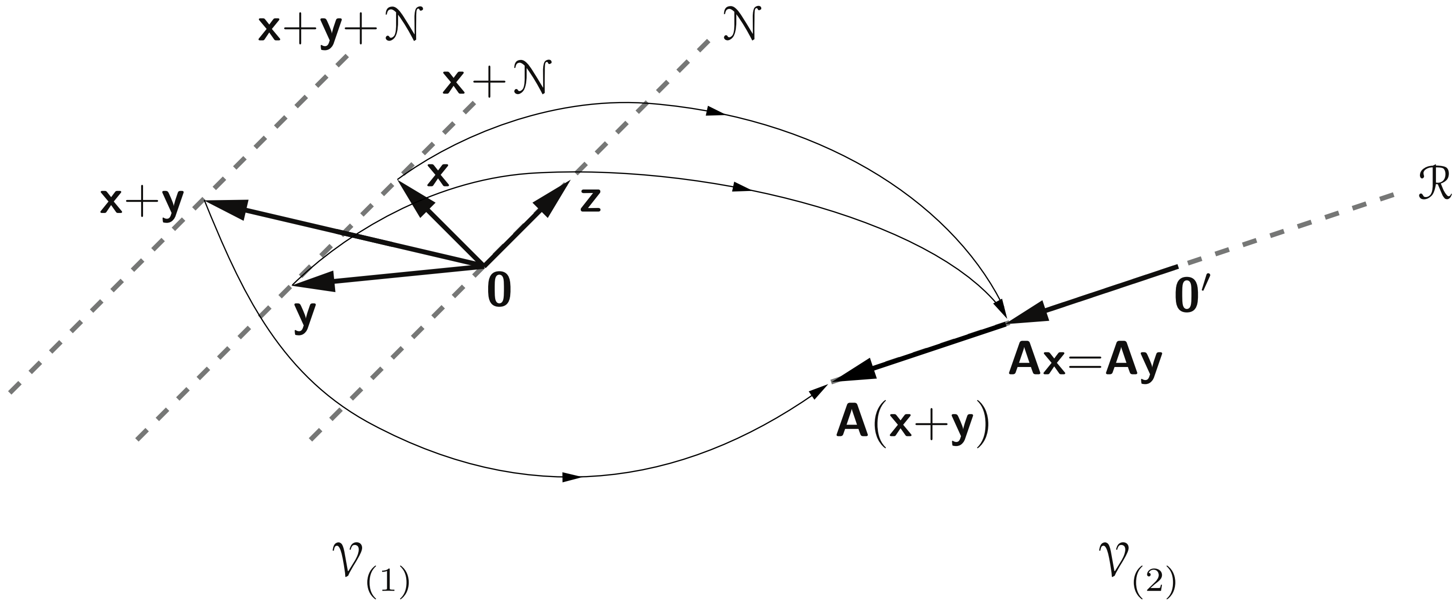

Figure 6.7: Left: $\mathcal{N}$ is the null space in $\mathcal{V}_{(1)}$ of the linear mapping $\mathbf{A}$. The vectors $\mathbf{x}$ and $\mathbf{y}$ belong to the same coset of $\mathcal{N}$. Right: $\mathcal{R}$ is the range of $\mathbf{A}$ in $\mathcal{V}_{(2)}$. Both $\mathbf{x}$ and $\mathbf{y}$ have the same image, $\mathbf{Ax} = \mathbf{Ay}$.

$$\mathbf{A} = \begin{pmatrix} 1 & -1 \\ \frac{1}{3} & -\frac{1}{3} \end{pmatrix}$$