

Linear Algebra

1. Find values of a , b , and c for which the matrix $\begin{pmatrix} a & \frac{1}{\sqrt{3}} & \frac{1}{\sqrt{6}} \\ 0 & b & \frac{2}{\sqrt{6}} \\ -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{3}} & c \end{pmatrix}$ is an orthogonal matrix.

2. Suppose vectors \mathbf{v}_1 , \mathbf{v}_2 , and \mathbf{v}_3 form an orthonormal basis for a certain inner product space V . Determine the angle between the vectors $\mathbf{v}_1 - \mathbf{v}_2$ and $\mathbf{v}_1 + \mathbf{v}_3$.