

6.2 Exercises

Problem 1 Determine whether $A = \begin{bmatrix} 6 & -5 & 2 \\ 4 & -3 & 2 \\ 2 & -2 & 3 \end{bmatrix}$ is diagonalizable.

If it is, find a diagonalizing matrix P and a diagonal matrix D such that $P^{-1}AP = D$.

Problem 2 Determine whether $A = \begin{bmatrix} -2 & 4 & -1 \\ -3 & 5 & -1 \\ -1 & 1 & 1 \end{bmatrix}$ is diagonalizable.

If it is, find a diagonalizing matrix P , and a diagonal matrix D such that $P^{-1}AP = D$.

Problem 3 Let \mathbf{A} be a 3×3 matrix with three distinct eigenvalues.

Tell how to construct six different invertible matrices $\mathbf{P}_1, \mathbf{P}_2, \dots, \mathbf{P}_6$

and six different diagonal matrices $\mathbf{D}_1, \mathbf{D}_2, \dots, \mathbf{D}_6$ such that $\mathbf{P}_i \mathbf{D}_i (\mathbf{P}_i)^{-1} = \mathbf{A}$ for each $i = 1, 2, \dots, 6$.