Financial Mathematics

Diagonalization of matrices

0033-1. Let $X := \begin{bmatrix} -5 & 4 \\ -1 & -1 \end{bmatrix}$.

Determine whether X is diagonalizable.

If so, find an invertible matrix A such that

$$A^{-1}XA \text{ is diagonal.}$$

0033-2. Let $Y := \begin{bmatrix} -31 & 42 \\ -20 & 27 \end{bmatrix}$.

Determine whether Y is diagonalizable.

If so, find an invertible matrix B such that

$$B^{-1}YB \text{ is diagonal.}$$

0033-3. Let $Z := \begin{bmatrix} 2 & 2 & 1 \\ -1 & 9 & 5 \\ 1 & -10 & -6 \end{bmatrix}$.

Determine whether Z is diagonalizable.

If so, find an invertible matrix C such that $C^{-1}ZC$ is diagonal.

Hint: -1 is an eigenvalue of Z.

0033-4. Let $Z := \begin{bmatrix} 7 & 16 & -8 \\ -4 & -13 & 8 \\ -4 & -16 & 11 \end{bmatrix}$.

Determine whether Z is diagonalizable.

If so, find an invertible matrix C such that $C^{-1}ZC$ is diagonal.

Hint: -1 is an eigenvalue of Z.