Exercise 35, Linear Algebra: A Modern Introduction, 4th Edition

Solved by experts

NEXT QUESTION

Linear Algebra: A Modern Introduction, 4th Edition, Chapter 6: Vector Spaces

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Exercise 35 Answer

Step by step explanation

HIDE ALL

Tip

- In this question, we will find eigenvalue.

Explanation

- We will take β as the standard basis.

- As $[T]_\beta$ is diagonalizable. We take β = C and $[T]_\beta = [T]_c$

Step 1 of 1

Let, $\beta = \{1, x\}$ be the standard basis of P_1
Then,
$T(1) = 1$
$T(x) = 2x$
Thus,

$$[T]_\beta = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$$

Since , $[T]_\beta$ is diagonalizable .
C = $\beta = \{1, x\}$ is the basis of P_1 such that $[T]_c$ is a diagonal matrix.
Therefore, T is diagonalizable.

Final Answer

C = $\{1, x\}$

$$[T]_c = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$$