

MATE 5150: Exam 01 Review

Alejandro Ouslan

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1 Determine if T is a Vector Space

2 Determine if T is in the Span of S

3 Proove that the pare of vectors is a basis for vector space V

1. Proove that the set S is linearly independent.
2. Proove that the set S spans V .

4 Generate a ppolynomial of Lagrange Interpolation of degree 3

5 Determine if T is bijective

1. Proove that T is linear.
2. Find the kernel of T .
3. Find the Rank of T .
4. Determine if it is 1-1.

6 Change of Basis

7 Answer of Given Questions

In \mathbb{R}^2 , let L be the line $y = mx$, where $m \neq 0$. Find an expression for $T(x, y)$, where

1. T is the reflection of R^2 about L .

$$M_x = \frac{x_1 + x_2}{2} \quad \text{and} \quad M_y = \frac{y_1 + y_2}{2}$$
$$AB = \frac{y_2 - y_1}{x_2 - x_1} = -1/m$$

2. T is the projection on L along the line perpendicular to L . (See the definition of projection in the exercises of Section 2.1.)