Handwritten HW 19

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44. Define a linear transformation $T : \mathbb{P}_2 \to \mathbb{R}^2$ by $T(\mathbf{p}) = \begin{bmatrix} \mathbf{p}(0) \\ \mathbf{p}(0) \end{bmatrix}$. Find polynomials \mathbf{p}_1 and \mathbf{p}_2 in \mathbb{P}_2 that span the kernel of T, and describe the range of T.

Solution:

47. Let V and W be vector spaces, and let $T : V \to W$ be a linear transformation. Given a subspace U of V, let T(U) denote the set of all images of the form $T(\mathbf{x})$, where \mathbf{x} is in U. Show that T(U) is a subspace of W.

Solution: