Unit 2 - Linear Algebra: Transformations, Eigenstuff, Diagonalization
Week 1 - Abstract Vector Spaces

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1

- Prove that the set, F_T of real-valued functions with period T, meaning $f(x+T) = f(x)$, is a vector sub-space of the space of all real-valued functions.
- Prove that the set of all periodic functions is NOT a vector space

2

Give the matrix which corresponds to the derivative operator on the set of functions spanned by $\{1, x, e^x, xe^x\}$. Then compute that matrixes null space and column space.

3

LLM 4.5.20 variation:
Suppose $\vec{v_1}, \ldots, \vec{v_n}$ is a linearly dependent spanning set for a vector space V. Show that each $\vec{w}$ in V can be expressed in more than one way as a linear combination of $\vec{v_1}, \ldots, \vec{v_n}$.