April 21 Problem Session

\[ \text{ILT: T10 T. U \rightarrow V} \]

\[ T^{-1}(V) \text{ subspace of } U \iff v = 0. \]  
\[ (\Leftarrow) v = 0 \Rightarrow T^{-1}(v) = T^{-1}(0) = \ker(T) \]

\[ (\Rightarrow) \quad \forall v \in T^{-1}(V) \Rightarrow T(v) = 0 \]
\[ T(0) = 0 \]

And \[ T(q) = 0 \quad \Rightarrow \quad x = T(q) = 0 \]
T: \mathbb{R}_+ \rightarrow M_{2 \times 2}

(a) \text{\textbf{\textit{T injective?}}} \\
\text{\textit{Strategy: compute } } K(T) \\
\text{\textit{Then } } K(T) : \text{ injective } \iff K(T) = \mathbb{R}_+ \\
K(T) = \mathbb{R}_+ \Rightarrow 0 \not\in \mathbb{R}_+ \quad \text{\textit{Yes}} \\
\text{Easier than } T(z) = T(y) \Rightarrow \ldots \Rightarrow z = y \\

\text{LT.M60} \\
Z: u \rightarrow v, \quad Z(u) = 0