#flo #ret #hw

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1 | **Problem 21!**

Suppose V is finite-dimensional and $T \in L(V, W)$. Prove that T is injective if and only if there exists $S \in L(W, V)$ such that ST is the identity map on V.

3.16 injectivity is equivalent to null space equals {0} 3.15 injective: T: V -> W is injective if $Tu = Tv$ implied $u = v$ 3.8 product of linear maps:

identity map on v: Iv = v

product of linear maps:

Suppose $S, T \in L(V, W)$ and $\lambda \in F$. The *sum* of $S + T$ and the *product* λT are the linear maps from V to W defined by

$$(S + T)(v) = Sv + Tv$$

and

$$(\lambda T)(v) = \lambda(Tv)$$

for all $v \in V$