Math 290 Friday, April 16 Section SLT

Writing E-1:

$\sim$ If $\underset{\sim}{x} \in W$ & $\underset{\sim}{x} \neq \underset{\sim}{0}$, then $\underset{\sim}{x}$ is an eigenvector of A.

Mon – IVLT

Tue – Problems
writing LT

Thu – VR

Fri – MR

\dim

"subjective"

Sage worksheets for Chapter LT (4)

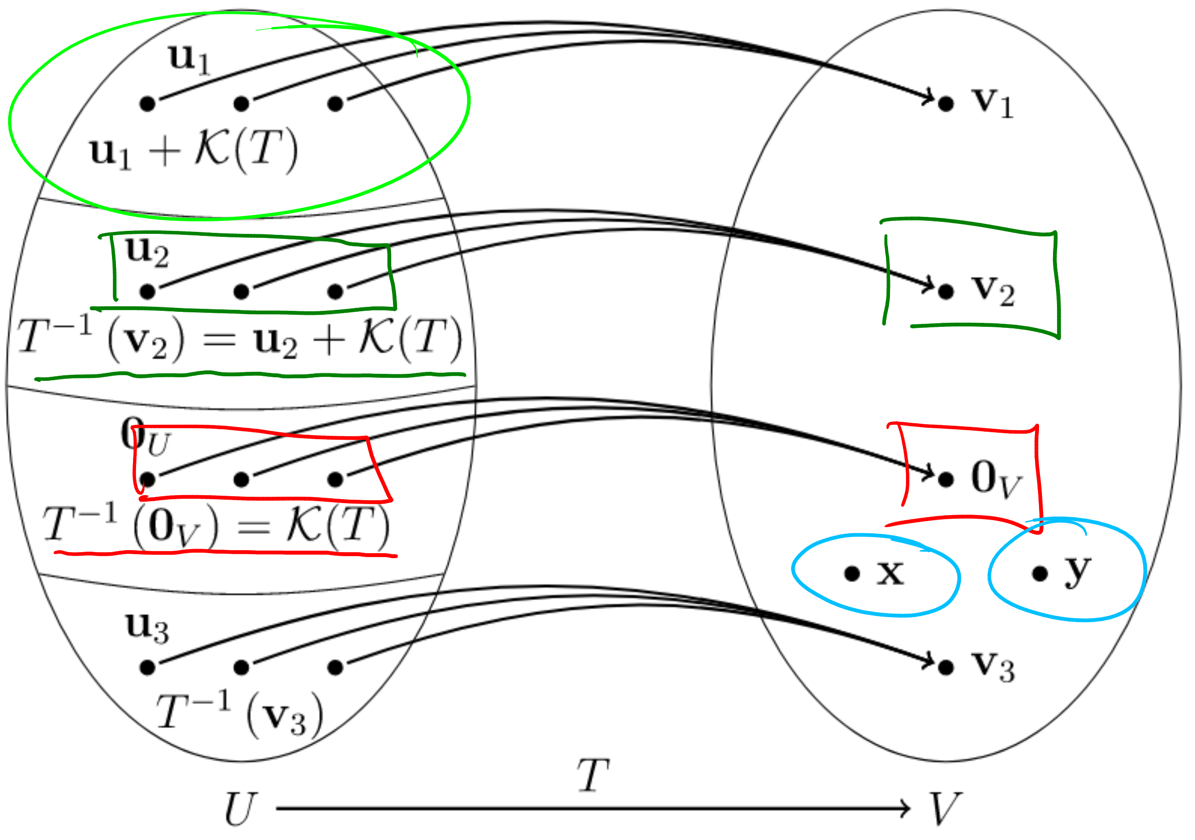


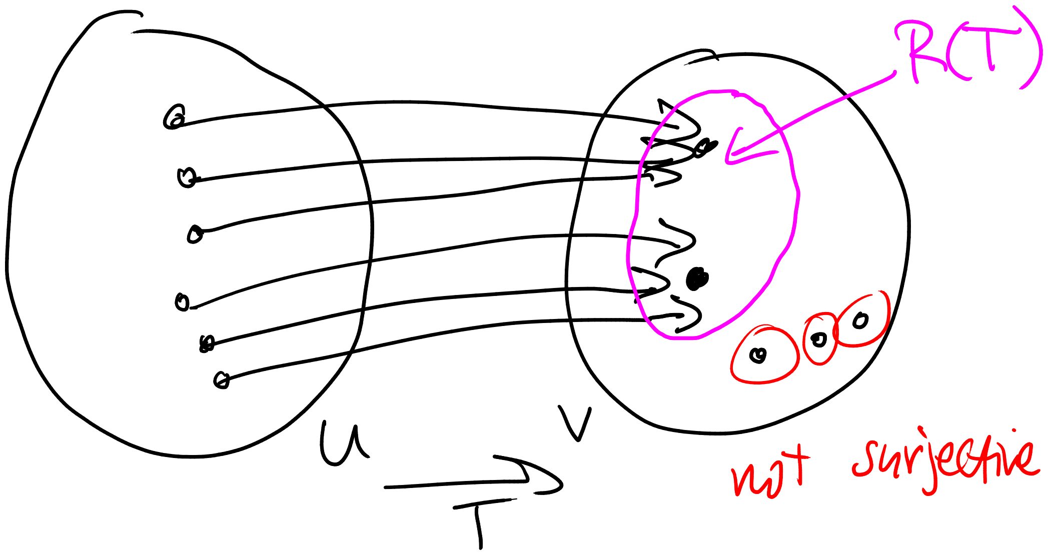
Figure KPI Kernel & Pre-Image
(Theorem PSPHS)

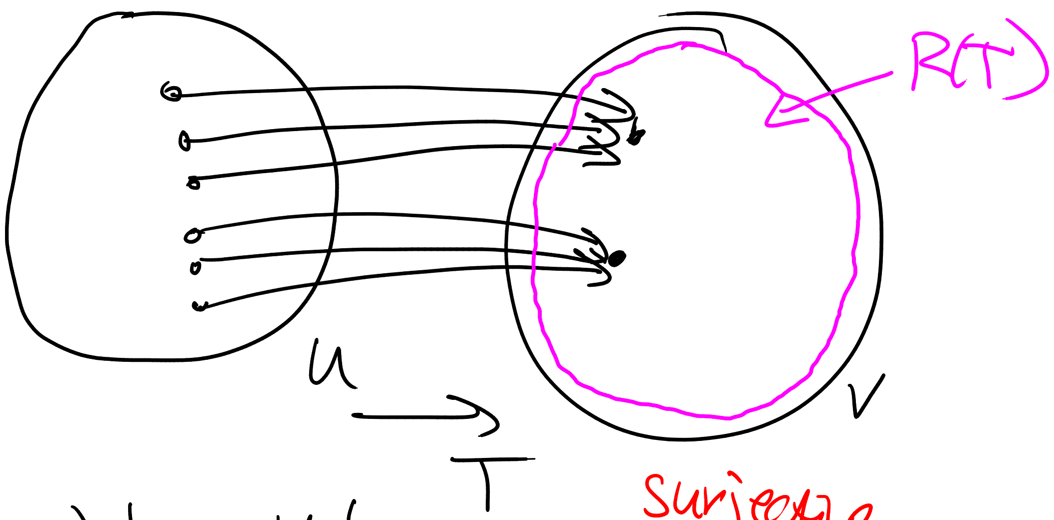
$\underset{\sim}{x} \notin \mathcal{R}(T)$ $\underset{\sim}{v_2} \in \mathcal{R}(T)$

Theorem RPI

$\underset{\sim}{v} \in \mathcal{R}(T) \iff T^{-1}(\underset{\sim}{v}) \neq \emptyset$

$T^{-1}(\underset{\sim}{x}) = \emptyset$





$f : \mathbb{R} \to \mathbb{R} \quad f(x) = x^2$

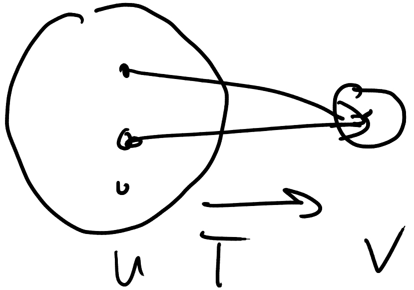
$R(f) = [0, \infty)$

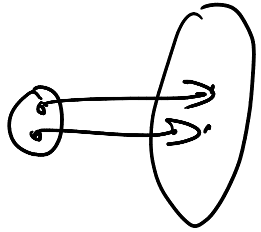
$R(T) = \{ T(\underset{\sim}{u}) \mid \underset{\sim}{u} \in U \}$

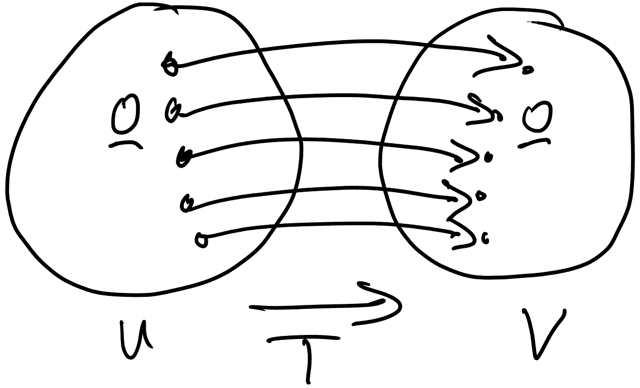
Theorem RSLT:

surjective $\iff$ $R(T) = V$

Ex Injective + Surjective







(See IVLT)

ZI injective + surjective

$\Rightarrow \dim(U) = \dim(V)$

Ex $R: M_{22} \to P_2$ $\quad R\left(\begin{bmatrix} a & b \\ c & d \end{bmatrix}\right) = (a+b+c+4d) + (-a+2c-5d)x + (2a+3b+6c+6d)x^2$

Surjective?

$R(\,?\,) = e + fx + gx^2$ Find ? for any

$R^{-1}(e+fx+gx^2) \neq \emptyset$?

$(a+b+c+4d) + (-a+2c-5d)x + (2a+3b+6c+6d)x^2 = e + fx + gx^2$

Soln $\left[\begin{array}{cccc|c} 1 & 1 & 1 & 4 & e \\ -1 & 0 & 2 & -5 & f \\ 2 & 3 & 6 & 6 & g \end{array}\right]$ for $\underline{a, b, c, d}$.

$\xrightarrow{RREF}$ $\left[\begin{array}{cccc|c} 1 & 0 & 0 & 3 & \sim \\ 0 & 1 & 0 & 2 & \sim \\ 0 & 0 & 1 & -1 & \sim \end{array}\right]$

this system has a infinitely many solution for every possible set of values of e, f & g

So R surjective!

$K(T) = \left\langle \left\{ \begin{bmatrix} -3 & -2 \\ 1 & 1 \end{bmatrix} \right\} \right\rangle$