$\frac{5}{6}$

$$A = \begin{bmatrix} 2 & -3 & 1 \\ -4 & 1 & 2 \\ 5 & 0 & 1 \end{bmatrix}$$

FIND AN EXAMPLE OF A 2×2 MATRIX SUCH THAT:

$$\| A \|_\infty = 1$$

BUT,

$$\rho(A) = \emptyset$$

WHAT DOES THIS IMPLY?

WELL,

$$\rho(\beta) = \{ \text{MAX} \mid \lambda \}$$

"SPECTRAL RADIUS" OF β

λ IS EIGENVALUE OF β

... SOME NOTES ON THIS:

RELATIONSHIP BETWEEN $\| \beta \|$ & $\rho(\beta)$:

1. $\rho(\beta)$ IS NOT A NORM

PROOF: TAKE $\beta = \begin{bmatrix} \emptyset & 1 \\ \emptyset & \emptyset \end{bmatrix} \Rightarrow \rho(\beta) = \emptyset$

BUT, $\| \beta \| = \emptyset$

MY ANALYSIS

WHAT ARE THE λ OF β?

ONE DETERMINES λ's OF ANY MATRIX BY:

$$\beta p = \lambda p \quad (p \neq \emptyset)$$

λ IS EIGENVALUE OF β

p IS THE ASSOCIATED EIGENVECTOR

$\beta(p(\lambda))$ OR $\lambda(\rho(\beta))$ OR ...

$$\beta p = \lambda p \longleftrightarrow (\beta - \lambda I) p = \emptyset \longleftrightarrow \det(\beta - \lambda I) = \emptyset$$

ONE CAN USE ANY OF THESE TO FIND λ & p