Math 390 Monday February 8

FCLA CP(ME?) - Characteristic Polynomial
- Multiplicity of Eigenvalues

IS worksheet

Correct:

.right_kernel(bases="pivot")

$$A\,[\mathbf{x}_1|\mathbf{x}_2|\cdots|\mathbf{x}_n] = [\mathbf{x}_1|\mathbf{x}_2|\cdots\,\mathbf{x}_n]\begin{bmatrix} X & X & X & \cdots & X \\ & X & X & & X \\ & & X & & X \\ & O & & \ddots & \vdots \\ & & & & X \end{bmatrix}$$

S $\qquad$ S

$A\mathbf{x}_1 = ?\,\mathbf{x}_1$ $\qquad$ $\langle \mathbf{x}_1 \rangle$ A-invariant

$A\mathbf{x}_2 = ?\,\mathbf{x}_1 + ?\,\mathbf{x}_2$ $\qquad$ $\langle \mathbf{x}_1, \mathbf{x}_2 \rangle$ A-invariant

$A\mathbf{x}_3 = ?\,\mathbf{x}_1 + ?\,\mathbf{x}_2 + ?\,\mathbf{x}_3$ $\qquad$ $\langle \mathbf{x}_1, \mathbf{x}_2, \mathbf{x}_3 \rangle$ A-invariant

There is a sequence of nested A-invariant subspaces

Tue- Problem Session

#11 via email by Noon tomorrow

Thu- Matrices / LT upgrade

Fri - BYOB Art

$U = \langle \{\tilde{x}_1, \tilde{x}_2, \dots, \tilde{x}_{n-1}\} \rangle$

$AS = ST$

$$\underset{n \times n}{A}\ \underset{n \times n-1}{[\tilde{x}_1 | \cdots | \tilde{x}_{n-1}]} = \underset{n \times n-1}{[\tilde{x}_1 | \cdots | \tilde{x}_{n-1}]}\ \underset{n-1 \times n-1}{\hat{T}}$$

$$T = \left[\begin{array}{cccc|c} x & x & x & \cdots\ x & x \\ & x & x & x & x \\ & & x & x & x \\ & & & \ddots\ \vdots & \vdots \\ & & & x & x \\ \hline & & & 0 & x \end{array}\right] \ ?$$

Induction!

$\hat{S}$

$A\hat{S} = \hat{S}\hat{T} \Rightarrow A^n \hat{S} = \hat{S}(\hat{T})^n$

$(\overrightarrow{uh} = \hat{u}$

Claim: $\dim(U \cap N(A^n)) = \dim(N(\hat{T}^n))$

$\dim = n-1$ topping out $\Rightarrow \dim(N(\hat{T}^{n-1})) = \dim(N(\hat{T}^n))$

$\hat{T}$ $n-1 \times n-1$ matrix

$T - \lambda I$ has 0 on diagonal if λ eigenvalue