HOMEWORK (SUGGESTED) Eigen Analysis 2020

1) **Prove**: a) $\lambda(A) = \lambda(A^T)$ b) $\lambda(A^*) = \overline{\lambda(A)}$

c) $\lambda^k \in \lambda(A^k)$, evecs (A^k) = evecs (A)

d) $\lambda^{-1} \in \lambda(A^{-1})$, evecs (A^{-1}) = evecs(A)

2) Create a generic matrix $A_{3\times3}$ and conclude that

$$A = P \Lambda P^{-1}$$

3) Create a 4×4 matrix A and expand it via dyadic expansion

4) Create a Hermitian matrix $A_{3\times3}$ and verify that

a) $\lambda(A) \in \mathbb{R}$ and $x_i \perp x_k$ $i \neq k$

b) Calculate left evecs as well: are they related somehow to the right evecs?

5) Jordan Form

a) What is it?

b) Jordan blocks: What are they & how to find

c) Solve problems 4 & 6 LAUB p93

Hint: read section 9.2: thm 9.22 part 2 (Real Jordan)

read section 9.3.1 & Example 9.33 LAUB