Department of Mathematics, School of advanced sciences
Winter Semester 2022-23 Instructor: Dr. Raghavendar. K
Applications of differential and difference equations(MAT2002)

Submit the e-record for the following.

Experiment-1A: Properties of Eigenvalues and Eigenvectors, Cayley-Hamilton theorem

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1. Let $A=\begin{pmatrix} 3 & 1 & -1 \\ 1 & 3 & -1 \\ -1 & -1 & 5 \end{pmatrix}$

   (a) Find characteristic equation of A(without using **poly** command).

   (b) Find eigen values by finding the roots of characteristic equation.

   (c) Find eigen vector X of A by solving the equation $AX = \lambda X$.

   (d) Verify the properties of Eigen values.

   (e) Verify Cayley-Hamilton theorem and find inverse

Experiment:1B–Diagonalization by similarity transformation, Orthogonal Transformation

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1. Diagonalize $A=\begin{pmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{pmatrix}$ by similarity transformation.
2. Transform the quadratic form $13x^2 - 10xy + 13y^2$ to canonical form and specify the matrix of transformation.

E-record Format

1. Title
2. Aim
3. Mathematical procedure
4. MATLAB Code(Along with screenshots)
5. output/Conclusion(Along with input and screenshots)

Note: Write your name and registration number in each page. Your name, date and time should appear in screenshots.