

The University of Zambia
Department of Mathematics and
Mat 3110-Engineering Mathematics II

Assignment 3- Submit by Wednesday, 19th May, 2021.

1. Find the eigenvalues and corresponding eigenvectors of the matrix

$$\begin{pmatrix} 3 & 1 & -1 \\ 2 & 2 & -1 \\ 2 & 2 & 0 \end{pmatrix}$$

2. Solve the following system of first order differential equations.

(a)

$$\begin{aligned} x' &= x - 3y \\ y' &= -2x + 2y \end{aligned}$$

(b)

$$\mathbf{x}' = \begin{pmatrix} 2 & 5 \\ -\frac{1}{2} & -\frac{3}{2} \end{pmatrix} \mathbf{x}$$

(c)

$$\mathbf{x}' = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \mathbf{x}, \quad \mathbf{x}(0) = \begin{pmatrix} 0 \\ 2 \end{pmatrix}.$$