Assignment 0

This is the first assignment for the course (MPM 1U0). As an individual assignment, it is due on January 31, 2023.

1. The matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ is given. Find $A^2$ and $A^3$.

2. The determinant of $A = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$ is $-5$. Find $A^2$.

3. The transfer function $F(s) = \frac{1}{s^2 + 2s + 1}$ corresponding to the differential equation

$$\frac{dy}{dt} + 2y + y = 0$$

4. The impulse response of a system is $u(t)$. Determine the transfer function.

5. The output of a system is $y(t)$. Determine the transfer function.

6. The input of a system is $u(t)$. Determine the transfer function.

Note: Each question is to be submitted by the due date.