MATH 3503 - Assignment 4

Due: March 14 2025

1 **Suppose there are three carts of equal mass m ans connected by two springs of constant k (and no connections to walls). Setup the system and find its general solution.**

2 **Let** $A = \begin{bmatrix} 5 & -4 & 4 \\ 0 & 3 & 0 \\ -2 & 4 & -1 \end{bmatrix}$**. a) What are the eigenvalues? b) Find the general solution of** $\vec{x}' = A\vec{x}$**.**

3 **Compute** e^{tA} **for the matrix** $A = \begin{bmatrix} 2 & 3 \\ 0 & 2 \end{bmatrix}$**.**

4 **Let** $A = \begin{bmatrix} -1 & -1 \\ 1 & -3 \end{bmatrix}$**. a) Find** e^{tA}**. b) Solve** $\vec{x}' = A\vec{x}, \vec{x}(0) = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$