1. (10 points) Consider the initial value problem

\[ y' = -5y + 5t^2 + 2t, \quad y(0) = \frac{1}{3}. \]

The exact solution is \( y(t) = t^2 + \frac{1}{3}e^{-5t}. \)

(a) Given \( h = 0.1 \) and \( w_0 = 1/3, w_1 = 0.212176887, w_2 = 0.16262648, w_3 = 0.16437672. \) Use the 4th order Adams-Bashforth method to compute an approximation to \( y(0.5). \) Compare you solution to the exact solution and find the error.

(b) Given \( h = 0.1 \) and \( w_0 = 1/3, w_1 = 0.212176887, w_2 = 0.16262648. \) Use the 4th order Adams-Moulton method to compute an approximation to \( y(0.5). \) Compare you solution to the exact solution and find the error.

2. (10 points) Use Gaussian elimination with scaled partial pivoting to solve the following problem:

\[
\begin{align*}
    x_1 + x_2 - x_3 &= 0 \\
    12x_2 - x_3 &= 4 \\
    2x_1 + x_2 + x_3 &= 5
\end{align*}
\]

Write down the augmented matrix at each iteration step.