1. Write a Matlab function 
\[ [t,y] = \text{bvpsolve}(u,v,w,a,b,\text{alpha},\text{beta},m) \]
to solve a linear two-point boundary value problem of the form
\[ y''(t) = u(t) + v(t)y(t) + w(t)y'(t) \]
\[ y(a) = \alpha, \quad y(b) = \beta \]
with the finite difference method. Use the subroutine \text{tridiag.m} presented in class to solve the tridiagonal linear system.
Assume that the functions \( u, v \) and \( w \) are defined separately, e.g., in a driver script.

2. Consider the problem
\[ t^2y''(t) - t(t+2)y'(t) + (t+2)y(t) = 0 \]
whose general solution is given by \( y(t) = c_1 t + c_2 e^t \).

(a) What is the solution if the boundary conditions
\[ y(1) = e, \quad y(2) = 2e^2 \]
are used?

(b) Test your code from Exercise 1 with this problem. Plot the approximate and exact solutions together for \( m = 19 \).

(c) Perform a series of experiments with \( m = 4, 9, 19, 39, 79 \), compute the maximum error and observe how it changes with \( m \) (or \( h \)).

3. Repeat Exercise 2 for the problem
\[ y''(t) + 2y'(t) + 10t = 0 \]
\[ y(0) = 1, \quad y(1) = 2 \]
whose general solution is given by \( y(t) = -\frac{5}{2}t^2 + \frac{5}{2}t + c_1 e^{-2t} + c_2 \).