Assignment 6

1. Write a code that uses piecewise linear finite element method to solve problem of the form,

$$\begin{aligned} -(a(x)u')' + b(x)u' + c(x)u &= f(x), \quad x \in (0,1), \\ u(0) &= u_l, \\ u(1) &= u_r. \end{aligned}$$

   Test your code by showing optimal convergence rates in H^1 and L^2 norm, for the problem with following data

$$\begin{aligned} u(x) &= e^x \sin x, \\ a(x) &= 1 + x, \\ b(x) &= 10, \\ c(x) &= e^x. \end{aligned}$$