Assignment 4

1. 4-Node Isoparametric Element

A) Create a Matlab[©] code to calculate the local stiffness matrix numerically for a rectangular 4-node isoparametric element. The element and the corresponding degrees of freedom are given in Figure 1. The inputs to the function are the Young's modulus E, the Poisson ratio υ, the width a of the element, the height h of the element and the thickness t of the element.
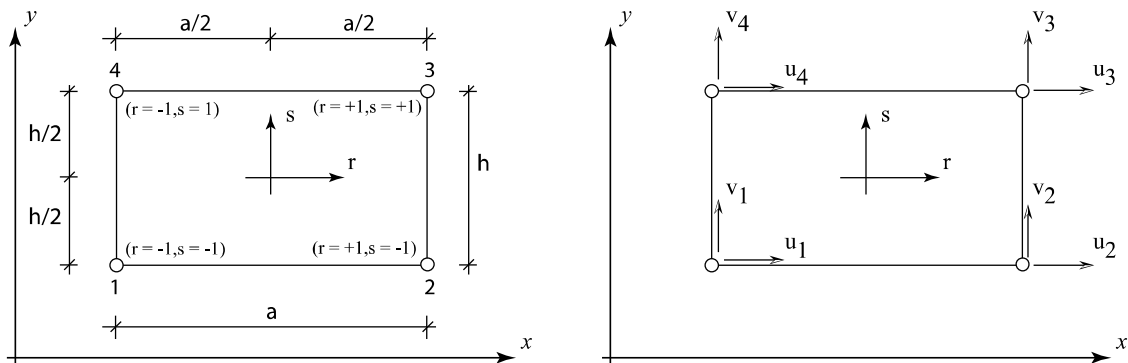

Figure 1. 4-node isoparametric element

B) Calculate the stiffness matrix for a rectangular 4-node isoparamentric element with the following properties by using the Matlab[©] code created in part A.

$E = 210\,000\ MPa$

$\upsilon = 0.3$

$a = 20\ mm$

$h = 10\ mm$

$t = 40\ mm$

C) Calculate the eigen values of the stiffness matrix and check whether the eigen values fulfill the properties you would expect. Discuss the results.

The Matlab[©] code should be submitted as a .m file in an electronic format.