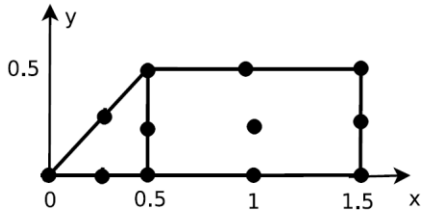
تکلیف سری پنجم موعد تحویل ۹ آذر

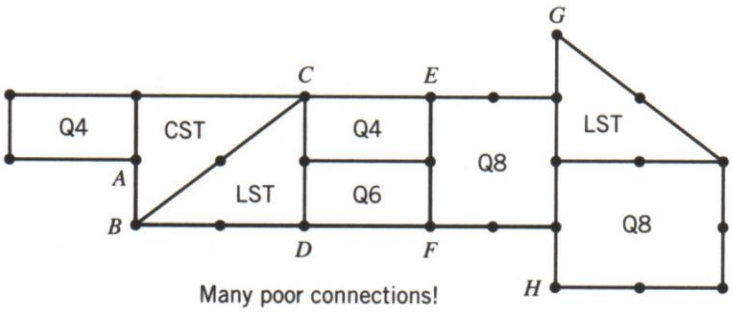
1. a) An element mesh is based on the following 6-node and 9-node elements



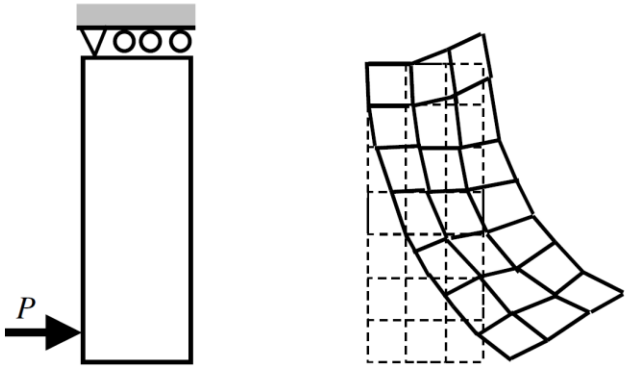
The approximation for the 6-node element is $T = \alpha_1 + \alpha_2 x + \alpha_3 y + \alpha_4 xy + \alpha_5 x^2 + \alpha_6 y^2$, while the approximation for the 9-node element is $T = \beta_1 + \beta_2 x + \beta_3 y + \beta_4 x^2 + \beta_5 y^2 + \beta_6 xy + \beta_7 x^2 y^2 + \beta_8 xy^2 + \beta_9 x^2 y$

Check if the convergence criterion is fulfilled.

b) Identify four problems with the mesh shown.

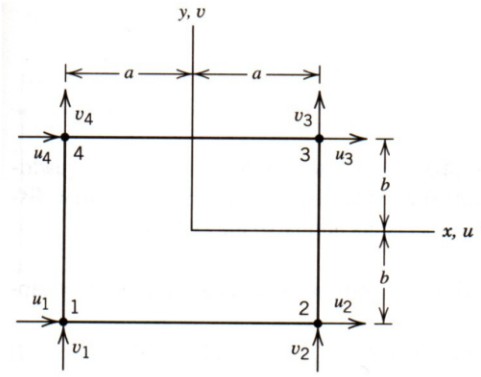


c) The figure on the right shows the displacement results after inputting the problem on the left. Has all the information been entered correctly? If not, what is wrong?



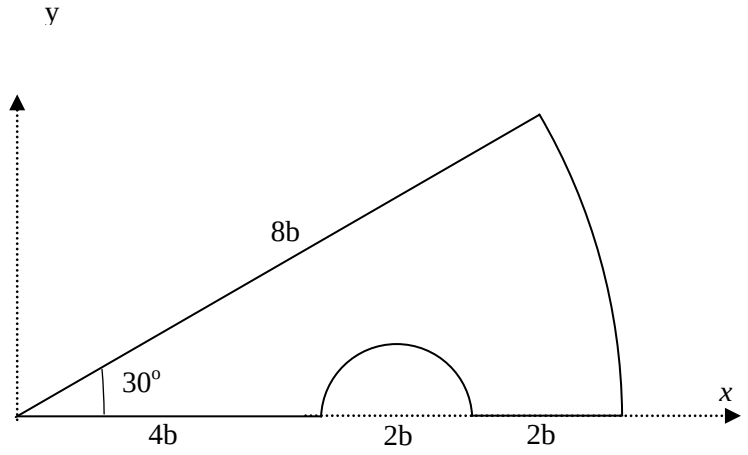
2. Given: - linear quadrilateral element shown
- plane strain formulation
- $a = b = 10$ mm
- nodal displacements shown
- $E = 200$ GPa and $\nu = 0.27$
- $s_y = 250$ MPa (ductile material)

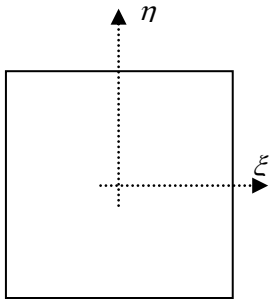
Find: (a) displacement at the center
(b) planar strain at center
(c) planar stress at center
(d) principle stresses at center
(e) von Mises stress at center
(f) factor of safety, if the stress from (e) represents the most extreme situation



$$\mathbf{d} = \begin{Bmatrix} u_1 \\ v_1 \\ u_2 \\ v_2 \\ u_3 \\ v_3 \\ u_4 \\ v_4 \end{Bmatrix} = \begin{Bmatrix} 0 \\ 0 \\ 2 \\ 0 \\ 1 \\ -1 \\ 0 \\ 0 \end{Bmatrix} \times 10^{-6} \text{ m}$$

سئوال اختیاری : مطلوبست محاسبه تابع نگاشتی که شکل زیر در داخل یک مربع تصویر نماید.





راهنمایی: فایل پیوست را مطالعه نمایید.