بسمه‌تعالی

Finite Element Method

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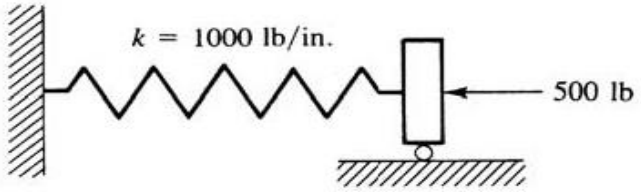
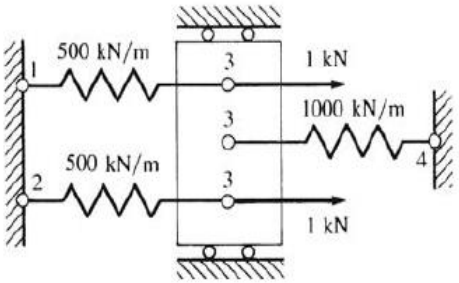
Homework #3	**Energy and Work Methods**	

1- The nonlinear spring in Figure below has the force/deformation relationship$f = k\delta^2$. Express the total potential energy of the spring, and use this potential energy to obtain the equilibrium value of displacement.

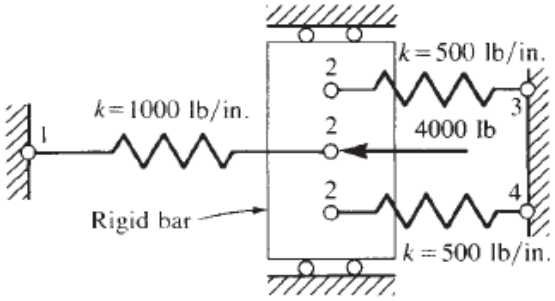


(The First Course in the Finite Element, Logan, 4th Edition)

2- For the spring assemblages shown in figures a and b determine the nodal displacements,the forces in each element, and the reactions. Solve problem by the potential energy approach.



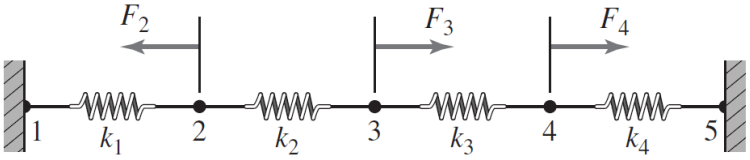
(A)



(B)

(The First Course in the Finite Element, D. L. Logan, 4th Edition)

3-Use Castigliano's first theorem to obtain the matrix equilibrium equations for the system of springs shown in the figure.



(Fundamentals of finite element analysis, D.V. Hutton)