تکلیف سری اول

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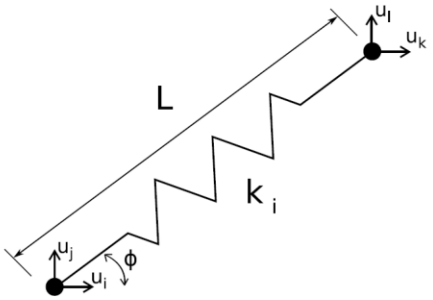
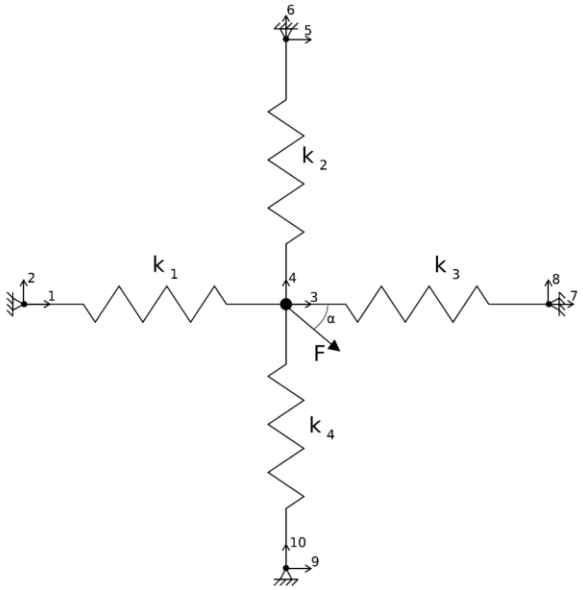
1)

The element stiffness matrix for a 2D spring is given by

$$\boldsymbol{K}_i^e = \frac{k_i}{L_i}\begin{bmatrix} \cos^2\phi & \sin\phi\cos\phi & -\cos^2\phi & -\sin\phi\cos\phi \\ \sin\phi\cos\phi & \sin^2\phi & -\sin\phi\cos\phi & -\sin^2\phi \\ -cos^2\phi & -\sin\phi\cos\phi & \cos^2\phi & \sin\phi\cos\phi \\ -\sin\phi\cos\phi & -\sin^2\phi & \sin\phi\cos\phi & \sin^2\phi \end{bmatrix}$$



a) Calculate the stiffness matrix **K** for the system. All springs have the length L and the angle α is 45^o



b) Calculate the displacement vector **a** for the situation shown above if $k_1 = k_2 = k_3 = k_4 = 1$, $L_1 = L_2 = L_3 = L_4 = 1$ and $F = \sqrt{2}$.

فصل سوم کتاب: مسایل ۱۰، ۱۴ و ۱۹