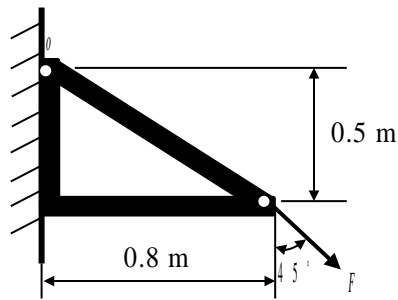


15. Given random force $F \sim N(500, 30^2)$ N, what is the distribution of the moment about point o ?



Solution

$$M_o = F \cos 45^\circ (0.8) - F \sin 45^\circ (0.5)$$

$$\mu_{M_o} = \mu_F \cos 45^\circ (0.8) - \mu_F \sin 45^\circ (0.5) = 500(0.2121) = 106.05 \text{ N.m}$$

$$\sigma_{M_o} = \sqrt{(\sigma_F \cos 45^\circ (0.8))^2 + (\sigma_F \sin 45^\circ (0.5))^2} = \sqrt{30^2 \left((\cos 45^\circ (0.8))^2 + (\sin 45^\circ (0.5))^2 \right)} = 20$$

Thus, the distribution of the moment of the force about point o is: $M_o \sim N(106.05, 20^2)$ N.m