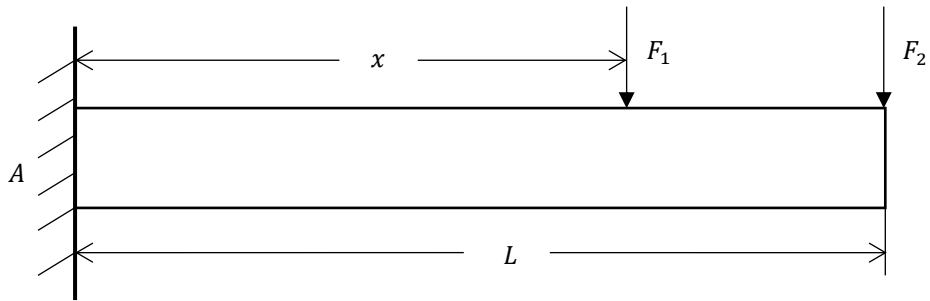


A cantilever beam of span of  $L = 2$  m is subjected to a deterministic force  $F_1 = 100$  kN and a random force  $F_2 \sim N(50, 20^2)$  kN as shown in the figure. The maximum allowable moment at A is  $M_{allow} = 300$  kN·m. If the reliability of the beam is at least 0.999, determine the point of action  $x$  for force  $F_1$ . HINT: The reliability is the probability that the moment at A is less than  $M_{allow}$ .



Solution

$$x = 0.764 \text{ m}$$