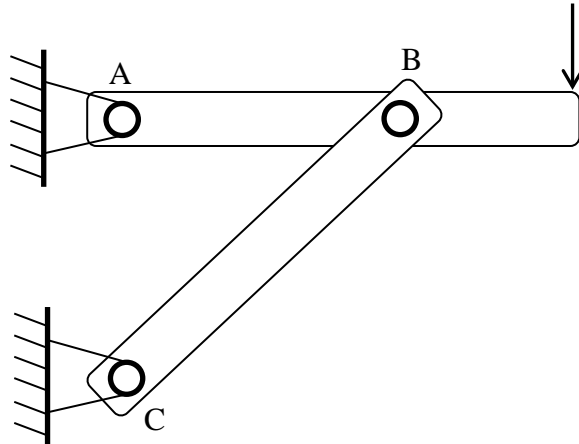


The support bar BC , used in a structural system as shown in the figure, is tested in two labs. The probability of yield failure based on the results from lab 1 is 10^{-3} , and the probability of buckling failure estimated by lab 2 is 10^{-4} . If the two failure modes are assumed to be independent, what is the reliability (the probability that the bar does not fail) of the bar?



Solution

Define events as follows.

E_1 = yield failure

E_2 = buckling failure

The reliability of bar $R = \Pr\{\bar{E}_1 \cap \bar{E}_2\} = \Pr\{\bar{E}_1\} \Pr\{\bar{E}_2\} = [1 - P(E_1)][1 - P(E_2)] = (1 - 10^{-3})(1 - 10^{-4}) = 0.9989$