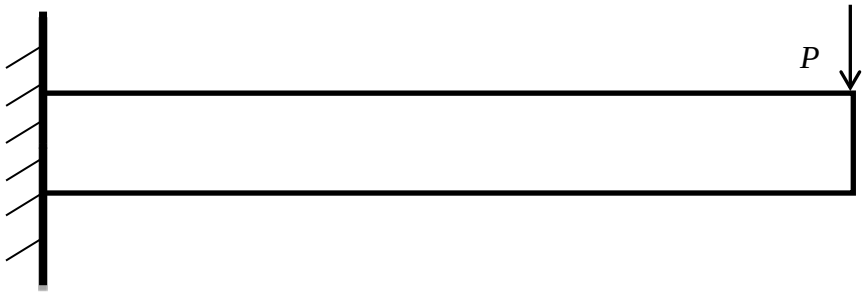
A cantilever beam is subjected to a force *P*. The probabilities of failure due to bending and shear are 0.002 and 0.0006, respectively. If the event of bending and shear are independent, what is the reliability of this cantilever beam?



Solution

Define events as follows.
E_1= Bending failure
E_2= Shear failure
The reliability of beam $R = \Pr\{\bar{E}_1 \cap \bar{E}_2\} = \Pr\{\bar{E}_1\}\Pr\{\bar{E}_2\} = [1 - P(E_1)]\,[1 - P(E_2)] = (1 - 0.002)(1 - 0.0006) = 0.9974$