

14. An axial tension $P \sim N(30, 3^2)$ kN and a torsion $T \sim N(8, 0.8^2)$ kN·m are applied to a cantilever. The cross-section of the cantilever is circular and its diameter is $d = 100$ mm. If the yield strength is $S_y \sim N(150, 20^2)$ MPa, determine the probability of failure using the First Order Second Moment Method and the distortion-energy theory. Note that P , T and S_y are assumed to be independent.

Answer: $p_f = 9.17(10^{-5})$

