

61. A completely reversed stress is applied to a rotating-beam. The ultimate strength of the beam is  $S_{ut} \sim N(500, 50^2)$  kpsi and the yield strength of the beam is  $S_y \sim N(600, 60^2)$  kpsi. If the fatigue strength fraction of the beam is  $f = 0.8$  and the maximum probability of failure is designed to be  $p_f = 10^{-5}$ , determine the maximum cycles of the reversed stress. Assume that  $S_{ut}$  and  $S_y$  are independent.

**Answer:**  $N = 575$