

Problem 4-4

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$$P(x_3 \leq \tilde{A}) \geq 1 - \alpha$$

$$P(x_4 \leq \tilde{B}) \geq 1 - \alpha$$

After rewriting these constraints to normal form:

$$x_3 \leq E(\tilde{A}) - Z_{1-\alpha} \sqrt{Var(\tilde{A})}$$

$$x_4 \leq E(\tilde{B}) - Z_{1-\alpha} \sqrt{Var(\tilde{B})}$$

Then we can replace the parameters with their actual values

$$x_3 \leq 500 - Z_{0.8} \sqrt{6000}$$

$$x_4 \leq 200 - Z_{0.8} \sqrt{12000}$$

From the standard normal distribution table, we have gotten:

$$Z_{0.8} = 0.2881$$

At the end, constraints have the following linear form:

$$\begin{aligned} x_3 &\leq 500 - 0.2881 \times 77.46 \\ &= 477.68 \end{aligned}$$

$$\begin{aligned} x_4 &\leq 200 - 0.2881 \times 109.54 \\ &= 168.44 \end{aligned}$$