

Problem 75

Strategy:

Cumulative distribution function transformation

$Y$ : monthly profit for Company I

$f_Y(y); F_Y(y)$

$X$ : monthly profit for Company II

$f_X(x); F_X(x)$

$$X = 2 \cdot Y$$

$$\begin{aligned} F_X(x) &= P_r(X \leq x) = P_r(2 \cdot Y \leq x) = P_r\left(Y \leq \frac{x}{2}\right) \\ &= F_Y\left(\frac{x}{2}\right) \end{aligned}$$

$$\begin{aligned} f_X(x) &= \frac{d}{dx} \cdot F_X(x) = \frac{d}{dx} \cdot F_Y\left(\frac{x}{2}\right) \\ &= \frac{1}{2} \cdot f_Y\left(\frac{x}{2}\right) \end{aligned}$$

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