

Problem 99

X : benefit paid to surgeon

Y : benefit paid to hospital

Due to increasing medical costs $\Rightarrow X^* = X + 100$

$$Y^* = 1.1 \cdot Y$$

$$\begin{aligned} V(X^* + Y^*) &= V(X + 100 + 1.1 \cdot Y) \\ &= V(X) + (1.1)^2 \cdot V(Y) + 2(1.1) \cdot \text{cov}(X, Y) \\ &= 5000 + (1.1)^2 (10,000) + 2.2 \cdot \text{cov}(X, Y) \end{aligned}$$

$$V(X + Y) = V(X) + V(Y) + 2 \cdot \text{cov}(X, Y)$$

$$17,000 = 5000 + 10,000 + 2 \cdot \text{cov}(X, Y)$$

$$1000 = \text{cov}(X, Y)$$

$$= 5000 + (1.1)^2 (10,000) + 2.2 (1000)$$

$$= \underline{\underline{19,300}}$$

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