AI1110 - Probability and Random Variables
Assignment 9

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Papoulis Chapter 8

Q 8-12

In a market survey, it was reported that 29% of respondents favor product A. The poll was conducted with confidence coefficient 0.95, and the margin of error was $\pm 4\%$. Find the number of respondents.

Solution I

The formula for interval estimate of probability is

$$p \approx \bar{x} \pm z_u \sqrt{\frac{\bar{x}(1-\bar{x})}{n}} \tag{1}$$

$$\Delta p = z_u \sqrt{\frac{\bar{x}(1-\bar{x})}{n}} \tag{2}$$

Given,

$$\bar{x} = 0.29 \tag{3}$$

$$\Delta p = 0.04 \tag{4}$$

$$\gamma = 0.95 \tag{5}$$

$$n = ? \tag{6}$$

Solution II

Therefore,

$$u = \frac{\gamma + 1}{2} = 0.975 \tag{7}$$

$$z_u = z_{0.975} = 2 \tag{8}$$

Putting the values in equation 2, we get

$$0.04 = 2\sqrt{\frac{0.29(1 - 0.29)}{n}} \tag{9}$$

$$\Rightarrow n \geq 514.75 \tag{10}$$

$$\Rightarrow n \geq 515 \tag{11}$$