

Assignment 4

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Outline

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Question

Papoulis ch4 ex 4.29

Suppose that in n trials, the probability that an event A occurs at least once equals P_1 . Show that if $P(A) = p$ and $pn \ll 1$, then $P_1 \approx np$.

Solution

If $P(A) = p$ then $P(\overline{A}) = 1 - p$

$P_1 = 1 - Q_1$ where Q_1 is the probability for the event A does not occur at all.

$Q_1 = (1 - p)^n$ if $pn \ll 1$ then

$$\implies Q_1 \approx 1 - np$$

$$\implies P_1 \approx np$$