Bonus Methodology

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A non-dominated metric means...

A. a metric vector for which no other vector is better

B. a metric value that is better than or equal to all others

C. a metric value that is better than all others

D. None of the above

E. I don’t know
We measure the performance of a radio link as a function of the modulation rate. Day/night is a nuisance factor. Which experimental plan is a proper randomization of the day/night factor?

A. A
B. B
C. Both
D. None
E. I don’t know
Solution

A proper randomization should be such that

\[ P(i|\text{day}) = P(i|\text{night}) \forall i \]

which is true for both A and B.

Answer C
The «scientific method» means

A. Carefully screen all experimental conditions
B. Beware of hidden factors
C. Do not draw a conclusion until you have exhausted all attempts to invalidate it
D. I do not know
A nuisance factor is

A. An unanticipated experimental condition that corrupts the results

B. A condition in the system that affects the performance but that we are not interested in

C. An unpleasant part of the performance evaluation

D. I do not know
A lazy performance analyst obtains a sequence of results as follows.
- $X_1$ is a sample of $\text{Poisson}(\lambda)$
- to obtain $X_n$: flip a coin; if TAIL $X_n$ is a sample of $\text{Poisson}(\lambda)$ else $X_n = X_{n-1}$

Is the sequence $X_n$ independent?

A. Yes
B. No
C. It depends on $\lambda$
D. I don’t know
Solution

\[ P(X_2 = i \mid X_1 = i) = 0.5 + 0.5 \, p_i \]
where \( p_i \) is the probability that a \textit{Poisson}(\( \lambda \)) random variable takes the value \( i \)

\[ P(X_2 = i \mid X_1 = j) = 0.5 \, p_i \text{ for } j \neq i \]

\[ P(X_2 = i \mid X_1 = j) \neq P(X_2 = i \mid X_1 = i) \text{ when } i \neq j \]

\( X_1 \) and \( X_2 \) are not independent

Answer B
A lazy performance analyst obtains a sequence of results as follows. - $X_1$ is a sample of $Poisson(\lambda)$
- to obtain $X_n$: flip a coin; if TAIL $X_n$ is a sample of $Poisson(\lambda)$
else $X_n = X_{n-1}$

Is the sequence $X_n$ identically distributed?

A. Yes
B. No
C. It depends on $\lambda$
D. I don’t know
Solution

\[ P(X_2 = j \mid \text{TAIL}) = p_j \]
\[ P(X_2 = j \mid \text{HEAD}) = P(X_1 = j) = p_j \]

\[ P(X_2 = j) = p_j, \forall j \]

And so on \( P(X_3 = j) = p_j, \forall j, \ldots \)

The distribution of \( X_n \) is the same as that of \( X_1 \)

Answer A