

CTS MS EXAM QUESTION – SPRING 2015

A classical Poisson process, $N(t)$, may have one of two equiprobable rates, $\lambda_2 > \lambda_1$. Let T_M be the time at which the M -th event occurs. It is required to decide which rate is present by comparing T_M to a threshold T_0 .

Choose λ_2 if $T_M < T_0$

Choose λ_1 if $T_M \geq T_0$

(1) Obtain the probability of an incorrect decision; i.e., the probability of error, P_e .

(2) Determine the value of T_0 that minimizes the probability of error.

[HINT: Begin by evaluating the distribution (or density) of T_M .]

An answer not supported by appropriate reasoning will not receive credit.

CTS MS EXAM QUESTION – SPRING 2015