~~1~~ ~~a~~

(2) $\text{Cov}[x(t), x(t+s)] = \text{Cov}[N(t+1) - N(t), N(t+s+1) - N(t+s)] =$

$\text{Cov}[N(t+1) N(t+s+1)] - \text{Cov}[N(t+1) N(t+s)]$

$+ \text{Cov}(N(t) N(t+s) - \text{Cov}[N(t) N(t+s+1)] =$

$\lambda(t+1) - \lambda \min(t+1, t+s) - \lambda t + \lambda(t+s)$

$= \lambda(t+s+1) - \lambda \min(t+1, t+s)$

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(1) (a) $E[Y] = E[x(t) - \lambda t] = \lambda - \lambda t = \lambda(1-t) \neq 0$

not wss

(1) (b) $P(T \leq s \mid x(t)=1) = P(x(s) \geq 1 \mid x(t)=1) =$ $0 < s < t$

$P(x(s) = 1 \mid x(t)=1) =$

$\text{Poi}(\frac{1}{\lambda})$

$$\frac{e^{-\frac{s}{\lambda}} (\frac{s}{\lambda})^1}{1!} \times \frac{e^{-\frac{1}{\lambda}(t-s)} (\frac{1}{\lambda}(t-s))^0}{0!} \Big/ \frac{e^{-\frac{1}{\lambda}t} (\frac{t}{\lambda})^1}{1!} = e^{\frac{-s}{\lambda}} e^{-\frac{t}{\lambda} + \frac{s}{\lambda}} \Big/ e^{-\frac{1}{\lambda}t} \frac{t}{\lambda} \cdot \frac{1}{\lambda} s = \frac{s}{t}$$