\[ \mathbb{E}(\text{Var}(X)) = \mathbb{E}(\frac{1}{\lambda^2}) = \frac{1}{\lambda^2} \]

Since \( \mathbb{E}(X) = \frac{1}{\lambda} \), we have
\[ \mathbb{E}(\text{Var}(X)) = \frac{\mathbb{E}(X)}{\mathbb{E}(X)^2} = \frac{1}{\lambda^2} \]

and
\[ \mathbb{E}(\text{Var}(X)) = \frac{1}{\lambda^2} \]

This means that the variance function of a Poisson process is constant.

An alternative approach: note that \( \lambda(x) \sim N(0, \sigma^2) \).

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Thus, 
\[ \mathbb{E}(\lambda(x)) = 0 \]

and
\[ \text{Var}(\lambda(x)) = \sigma^2 \]

By this reasoning (and, of course, we must also be licensed to translate.)

For this reason, as well as the symmetry, \( \lambda_t, \lambda_{t+1} \]

Solutions to HW-7:

- 1

Both the process and the above conditions are independent of increments.

\[ \frac{2}{3} \lambda_t + \frac{1}{3} \lambda_{t+1} \]

since, due to stationarity,

\[ \mathbb{E}(\text{Var}(X)) = \frac{1}{\lambda^2} \]

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By this reasoning (and, of course, we must also be licensed to translate.)

For this reason, as well as the symmetry, \( \lambda_t, \lambda_{t+1} \]

Solutions to HW-7:

- 1

Since the process is stationary,

\[ \frac{2}{3} \lambda_t + \frac{1}{3} \lambda_{t+1} \]
\[ E_{\text{W}} = \frac{1}{2} E_T = 2 \]

so that

\[ 0 = E_{\text{W}}(\frac{1}{2}) = \frac{1}{2} E_T - E_{\text{F}} \]

so from (6),

\[ E_{\text{W}} = E_{\text{F}} = 0 \]