

WST312 Stochastic Processes 2018

Practical 1

Consider the compound Poisson process to model the claims of an insurance company:

$$Y_t = \begin{cases} \sum_{i=1}^{N_t} X_i & \text{if } N_t > 0 \\ 0 & \text{if } N_t = 0 \end{cases}$$

where N_t is the number of claims during the interval $[0, t]$ and the X_i 's are independent, identically distributed random variables representing the amount of the i^{th} claim.

a) What is the distribution of N_t ? (*theory*)

b) What do the Y_t 's represent? (*theory*)

c) What are the theoretical and sample estimates for the mean and variance of this Poisson process if

i) $X_i \sim \text{gamma}(4.15, 24)$?

ii) $X_i \sim N(85, 25)$?

Take $\lambda = 0.25$, $t = 395$ and use a sample of size 550. **Always use a seed of 1.** Give your answers in the following format.

	Sample Estimates	Theoretical
Mean		
Variance		

NB. You must write code for the sample estimates and the theoretical values using SAS and R. Compare the output from both and comment.