Neuronal Spike Trains

BIOF2014

Problem

You are measuring spike trains from a neuron, and you measure the number of spikes observed in multiple experiments, each with different recording time intervals.

You record the following results:

time interval (min)	number of spikes
1	6
1	8
1	2
2	11
2	14
3	14
3	17

You performed the experiment again after treating the neuron with a compound.

time interval (min)	number of spikes
1	1
2	3
4	6
5	9

What is the spiking rate per minute before and after compound treatment?

Tasks

1. Implement a quantification model in Stan to estimate the posterior distribution of the spiking rates in under different treatment conditions.
2. Derive the posterior distribution of the spiking rates.
3. What effect does the compound have on spiking rate?