BT6270 Computational Neuroscience Assignment 1

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1 Threshold values of External Current

The threshold currents are as follows:

- I1 = 0.03 $\mu A/mm^2$
- I2 = 0.06 $\mu A/mm^2$
- I3 = 0.45 $\mu A/mm^2$

These values were obtained with a current sampling interval of `0.01` $\mu A/mm^2$ from `0` $\mu A/mm^2$ to `0.6` $\mu A/mm^2$. Hence, finer thresholds are not recorded.

2 Assumptions

The assumptions made in the construction of the plot are as follows:

- The voltage threshold of a peak is set to `10mV`. All voltage peaks greater than `10mV` are considered in the spike count.
- Input current (`I1`) at which spiking occurs is calculated by identifying the current where the number of spikes first becomes non zero.
- The current `I2` is calculated by identifying the current at which the number of spikes increases by more than 4 in the next current instant.
- The current `I3` is calculated by identifying the current at which the number of spikes decreases by more than 2 in the next current instant.

3 Plot

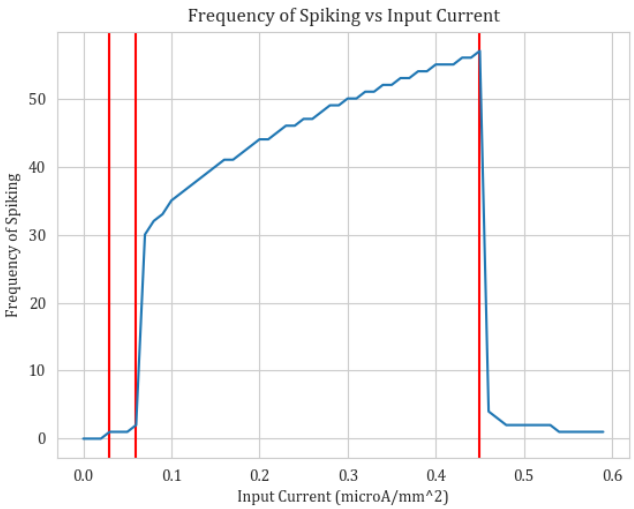

Figure 1: The change in frequency of firing as a function of Input current. The number of iterations performed for each current instance: $5(10^4)$. The red vertical bars indicate the current thresholds - `I1, I2 & I3` respectively (and in the left to right order).