COMPUTATIONAL NEUROSCIENCE

Assignment 1

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Question 1:

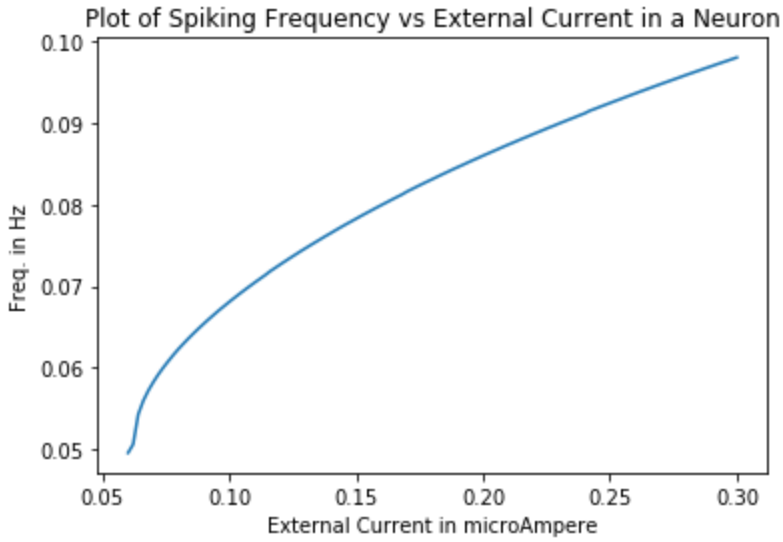
The threshold values of current (in microamperes) are reported as follows:

I_1 = 0.0223 μA
I_2 = 0.0622 μA
I_3 = 0.3 μA

Note: The value of I_3 was calculated by classifying only peaks with maxima greater than 20 mV as AP's.
It was observed that until I_1 no AP's were produced. After I_1, only a finite number of AP's were produced until I_2 ,after which periodic spike trains were observed. No AP's, according to our definition, were found after I_3.

Question 2:

The notion of frequency is defined only after I_2, after impulse trains are produced. Before I_2, the plot has no meaning. Thus **the plot only portrays the behaviour in the region I_2 to I_3.**



Observations:

- The response keeps dying down in its amplitude as I is increased. After a point, the AP's get distorted.
- It is observed that the frequency plot is a concave-downward curve. The rate of increase of spiking frequency keeps dropping and tends to saturate.
  Note that concave-upward curves are uncommon found in natural systems as the dependent variables of the system tend to infinity as the independent variable tends to infinity.