Tutorial 2.3 by Clark Xu.

Code file is ExponentialLIF.m

To view plots for questions, edit variable question\_number to 1, 2, 3, or 4, matching to question 1(a), 1(b), 2(a), and 2(b) respectively.

Tutorial question 1(a):

图形用户界面, 图表, 条形图, 直方图

描述已自动生成

Tutorial question 1(b)

图表, 折线图

描述已自动生成

Comments:

Figure in question 1(a) shows that the spike appears more frequently when there’s a steady applied current above threshold that applied on the neuron. The adaptive conductance grows exponentially and remained in a relative steady states at the end of pulse. The spike rate also tends to be stable at the end of the pulse in the graph.

From figures in question 1(b), we can observe that the firing rate at steady state increasing “almost” linearly as the applied current increases within the 0.25 to 0.55nA range. Within this applied current range, the spike rate for steady states varied from 0 to 50 Hz. The firing rate for neuron’s initial state shows a similar trend, but has a faster growing rate. Noted that there’s a large increase in firing rate when applied current increase from threshold (0.25nA) to 0.27nA for both initial and steady state.

0.25nA is the threshold for firing for both states. When the applied current is lower than 0.25nA, both firing rates for initial and steady states are “zero” (i.e. not firing in the 5-second simulation time).

Question 2(a)

图形用户界面, 图表

描述已自动生成

Question 2(b)

图表, 折线图

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