Introduction to Neural and Cognitive Modelling (CS9.427)

Monsoon 2022, IIIT Hyderabad
Assignment 1

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Figure 1 shows the f-I curve for the given parameters

$$\begin{aligned} U_{\text{rest}} &= -70\text{mV}, \\ \theta &= -45\text{mV}, \\ \tau &= 15\text{ms}, \\ R &= 40 \cdot 10^6 \Omega. \end{aligned}$$

$f(I)$ represents the value of the frequency at the current I, while $g(F)$ is the inverse of this: it represents the current required to achieve the frequency F.

Using this function g, we can obtain the range of I required. We can see that for

$$f \in [0, 40] \text{ Hz}$$

to hold, we must have

$$I \in [6.3 \cdot 10^{-7}, 1.5739 \cdot 10^{-4}] \text{ A}.$$

This is the required range.

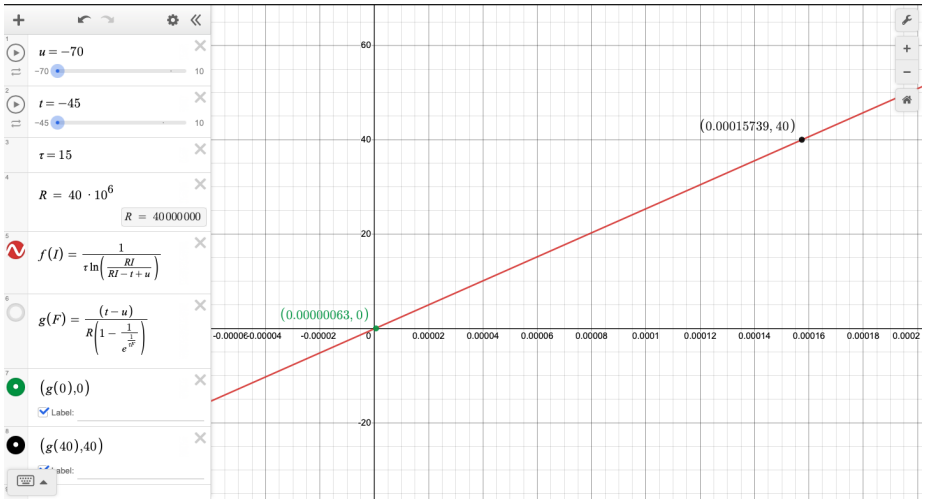

Figure 1: Gain Curve for Given Parameters