

# Introduction to Neural and Cognitive Modelling (CS9.427)

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Assignment 1

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## Assignment 1

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

$$I \in [6.25 \cdot 10^{-10}, 7.7 \cdot 10^{-10}] \text{ A}.$$

This is the required range.

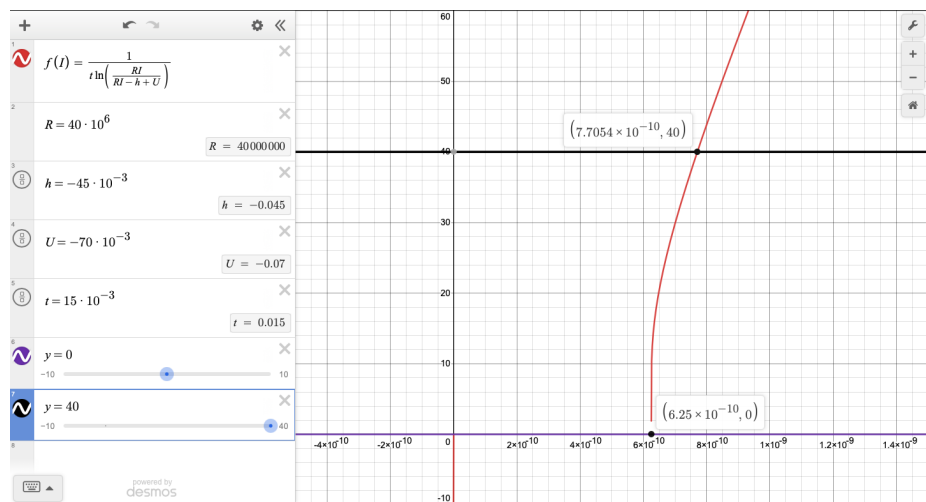


Figure 1: Gain Curve for Given Parameters