

## Introduction to Computational Neuroscience

### Lab 1: Constructing an H&H-like current in Matlab

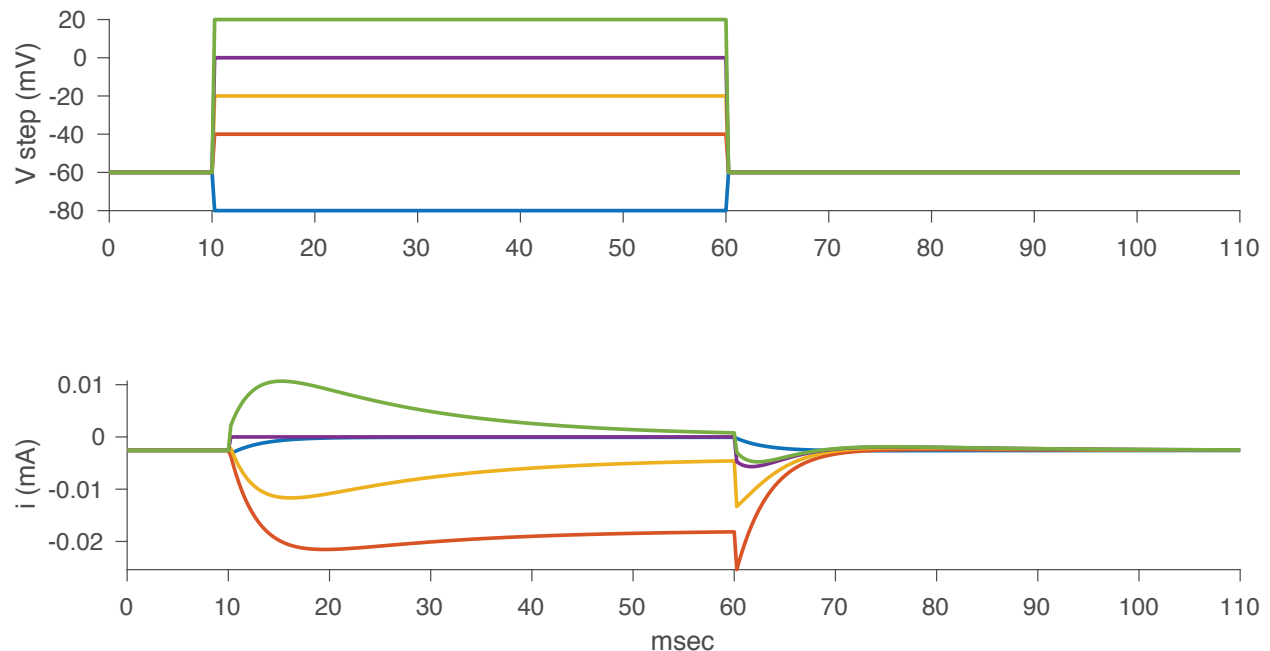
In this lab you will construct a Matlab model of a voltage- and time-dependent current. The goal is to use the H&H formalism to mimic the voltage-clamp response of an unknown current.

#### Load the voltage-clamp data

Load the data file:

```
load('CookAssignemnt1UnknownCurrent.mat')
```

Three variables will be created: 1) Time in ms (t). 2) The time-course of the voltage in mV (vStep, a matrix of 5 different steps where the rows are time and the columns correspond to each step). 3) The current in mA (iUnknownCurrent, matrix of the current in response to each voltage sweep).



**Using the H&H formalism discussed in class, construct a Matlab model that takes each voltage-clamp sweep as an input and produces a current as the output**

Adjust the parameters of the model to best mimic the unknown current.

If desired, model parameters can be adjusted by hand.

You may use the example model of a voltage-dependent current `iSingleActivating.m` as the basis for your model.

Hint: you may assume that all  $\tau$  are constant.

### **What to hand in**

All files should be in a single compressed folder named *yourLastName\_CookAI* and include:

- 1) A PDF file of a plot similar to that below that shows all the components of the model and lists the parameters. The plot should also show the current traces of the data (dashed) compared to your model's current (solid).
- 2) All the Matlab code used for the model.

### **Grading**

50% for constructing an appropriate Matlab model that runs.

50% for the ability of the model to mimic the data.

## EXAMPLE OF PLOT TO HAND IN

