LSM4213

Practical 1

Introduction to Computational Neuroscience

This practical reviews material required for the final exam, but also includes material not required (for the final exam). Hopefully the non-compulsory material will help solidify your comfort with the required material. As stated in L10, calculus is required. While we have given an overview of calculus so that you understand it, the only specific calculus skills required are (i) find expressions for steady state quantities, and (ii) find expressions for integrating differential equations by Euler's method. Programming or coding is not required. In this practical, we review Euler's method (required), and write code (not required) that uses the method to simulate neurons. We also review the concepts (required) of membrane resistance, membrane time constant, and reversal potential.

Instructions

- The Practical 1 folder contains the following Google Colab notebooks:
  - P1A_Euler's_method,_simple_example.ipynb
  - P1B_Euler's_method,_resistance_&_time_constant.ipynb
  - P1C_Simple_network,_excitation_&_inhibition.ipynb
- Go through the Colab notebooks in the above sequence. Each notebook contains text cells with explanations and code cells with mainly Python code. Code cells also contain non-Python code (preceded with a !) that are instructions to the operating system that Google is providing through Colab for you to run the code online.
- Register for a Google account at https://www.google.com/account/about/. Registration is free and will give you access to Google Drive and Google Colab, which we will use. You already have a Google account if you have Gmail.
- Sign-in to your Google account.
- Go to Google Drive https://www.google.com/drive/.

➢ Upload P1A_Euler's_method,_simple_example.ipynb to your Google Drive.

➢ Open P1A_Euler's_method,_simple_example.ipynb in Colab, by right clicking or double clicking on its filename in Google Drive, then choosing "Open with" followed by "Google Colaboratory".

➢ Go through the cells in the notebook sequentially. For text cells, make sure you understand the explanation. For code cells, follow instructions and run the code.

➢ Repeat the steps marked with a ➢ for P1B and P1C.