Tutorial K - Biophysical models using the Brain Dynamics Toolbox

Content

The Brain Dynamics Toolbox (bdtoolbox.org) is a Matlab toolbox for simulating dynamical systems in neuroscience. It allows custom dynamical models to be explored with minimal programming effort. This is an introductory tutorial for new users. The format will be a mix of on-line lectures and self-paced exercises. Participants will be guided through the process of running an existing model and visualising the dynamics using both the graphical controls and the Matlab command line. Upon completion, participants will be able to automate a parameter sweep and produce a bifurcation diagram. No previous modeling experience is required but basic knowledge of Matlab is assumed.

Installation guide

1. In the tutorial we will use MATLAB. Please make sure you install MATLAB (version R2020a or newer) and that you can open and run it: https://www.mathworks.com/products/get-matlab.html

2. Next, you will need to install the Brain Dynamics Toolbox from https://bdtoolbox.org. Installation is a simple matter of unzipping the source code into a location of your choosing (e.g., *Desktop/CPC2024/Tutorial_K*).

3. The main scripts of the toolbox are located in the top level of the *bdtoolbox* directory. That directory must be in the MATLAB search path. It is also advisable to include the *bdtoolbox/models* directory in the search path if you intend to run any of the example models. To add them, open MATLAB, navigate to the folder where you unzipped the toolbox (e.g., *Desktop/CPC2023/Tutoria_Kl*) and type the following in the command line:
    ```
    >> addpath bdtoolbox-2023a
    >> addpath bdtoolbox-2023a/models
    ```

Further support

If you have trouble getting to this point before the Practical Tutorial Session, please consult the **#tutorial-helpdesk channel on Discord**. You will be given access to the CPC Slack workspace at the beginning of the course. Check if anyone has had the same issue and has managed to solve it and how. If no one else has encountered the same problem, post your question. We will be monitoring the channel and providing support. In addition, given the volume of attendees this year, we would be really grateful if you could assist us by answering queries on Discord yourself if you come across a problem, you know and have solved.

Tutors

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