A while ago I wrote a paper (<http://www.frontiersin.org/Synaptic_Neuroscience/10.3389/fnsyn.2010.00031/abstract>) and did not make the code public at the time. As we all know this is incredibly bad practice and I am now rectifying this by writing a post explaining the code an how to use the model withing MATLAB. I intend this post to evolve over time with more and more explanation being added. At present the the code commenting is fairly basic and the user guide is simply a short list of instructions below but as they say something is hetter than nothing! please add any questions or requests to the comments below and I will respond ASAP.

A full zip file containing all the files can be found here: <http://owenrackham.co.uk/files/matlab_STDP_blog.zip>

The main function of the program is proc.m, this calls all of the sub functions that implement the parts of the ODE. Within the code you will see the names of these functions and the files for these functions contain a description of the part of the ODE that they represent.

A function is provided to create artificial spike trains in trainFunc.m. A call to this function of the form: [pretrain,posttrain] = trainFunc(3,0.1,[1],[1,1.01,1.02]) will create two arrays (posttrain and pretrain) that can be used to test the program on from within the GUI (as described below).

The other files within this directory are used by the GUI in order to plot changes in parameters. The files are not commented as heavily but simply run parts of the ODE over predefined ranges so that you can see the effect of changing a parameter easily.

So here is a step by stem guide to running an example using this program:

1. Download and unzip the code into a directory (<http://owenrackham.co.uk/files/matlab_STDP_blog.zip>)
2. Open MATLAB and change to the directory where you put the code.
3. Run the trainFunc function to create so test data ([pretrain,posttrain] = trainFunc(3,0.1,[1],[1,1.01,1.02]) )
4. run GUIBPAP from the MATLAB command line which will launch the rough GUI that I have made (shown below)
5. enter the variable names into the pre syn train and post syn train box (as shown in the image below)
6. click run model. The model will run in the background but you will be able to see its progress from the MATLAB command terminal.
7. A set of graphs will appear showing the result of the model running on the test data. (you may need to zoom in to see the results since the plotting script expects very long spike trains it defaults to a zoomed out view)