Check out the options in the function: Type:

>> help apply\_derivative\_boost

You need the Signal Processing Toolbox (free from Matlab) installed. Check for it:

>> which downsample

This should produce something like:

/Applications/MATLAB\_R2007b/toolbox/signal/signal/downsample.m

(it should be a Matlab directory)

go to SPM single-subject results directory by dragging it into the Matlab command window.

Do you have nuisance covariates?

>> load SPM

or review design in the SPM graphical interface:

Figure out which columns in the design matrix you calculate contrasts over. The apply\_derivative\_boost function will save amplitude images for every triplet of columns (predictors) if you use 3 basis functions, or every pair if you use 2. Each triplet (or pair) corresponds to a particular event/condition type, with 3 or 2 regressors for the different basis functions for the condition.

Let’s say you have 18 regressors of interest, and possibly other nuisance parameters:

apply\_derivative\_boost(‘all’,'condition\_numbers',1:18, ‘nodb’);

If you don’t have any nuisance regressors (apart from the intercept(s)), this should work:

apply\_derivative\_boost(‘all’, ‘nodb’)

In the output:

db\_amplitude\_001.img: This is the amplitude image for the first condition (triplet (pair) of regressors).

db\_amplitude\_002.img: This is the amplitude image for the second condition

If you have contrasts specified in SPM (should be F-contrasts with t-contrasts for each basis function that compare two or more conditions; i.e., [1 0 0 -1 0 0; 0 1 0 0 -1 0; 0 0 1 0 0 -1] for a three basis-function model and two event types.)

apply\_derivative\_boost in ‘all’ or ‘contrasts’ mode will use the names of your contrasts saved in the SPM.mat file to name the images:

stop inhibit - baseline - All Sessions.img : This is a contrast image for a contrast named “stop inhibit - baseline - All Sessions.”

To do a group analysis, you would collect the contrast images with the same name for each subject, and put those into a 2nd-level analysis (e.g., one-sample T-test).

If you wanted to make a bar graph of amplitudes for different conditions, and you would normally use the beta00\*\*.img files, you can use db\_amplitude\_0\*\*.img images instead. The amplitude images are based on the total fitted response, whereas the beta images correspond to particular basis function. There is no one basis function that is amplitude – amplitude is a nonlinear combination of the beta images – and so using one beta image as an estimate of the amplitude/overall response isn’t appropriate.

You can also do 2nd level tests on time to peak, response width, or area-under-the curve (AUC)