Script to plot Figure 5, Data

Table of Contents

Set some parameters 1
Load the data 1
Compute spectra of each epoch 1
Summarize spectra and time series 2

Winawer, Kay, Foster, Parvizi, Wandell. **Asynchronous broadband signals are the principal source of the BOLD response in human visual cortex** *Current Biology, 2013*

This script plots the times series and the spectal responses from an ECoG channel to large-field flicker. It produces the two panels on the left side of figure 5. Data comes from subject 1, channel 66 (V1/V2 fovea).

Code by Jonathan Winawer, 2013

Set some parameters

```
savepth   = fullfile(ecogPRFrootPath, 'scratch');
calcPower = true;  % Plot spectra as power (squared amplitude)
useHann   = false; % Use a Hanning window for spectral analysis
fmax      = 150;
stimF     = 15;
```

Load the data

```
% This includes
%   t:          time vector (seconds), 1x3 cell for 3 runs
%   ts:         raw time series (microvolts), 1x3 cell for 3 runs
%   onsets:     epoch onsets in temporal samples (not seconds), 1x3 cell
%   sampleRate: ECoG sampling rate, in Hz
%   T:          epoch length (in seconds)
%   subjnum:    subject number (corresponds with numbering in paper)
%   runType:    indicates that this data comes from OnOff expts
%   dataType:   indicates that data was referenced to common average
%
%   Note that each run consisted of 6 'on' epochs, followed by 6
%   'off' epochs, repeated 4 times (i.e., 4 on-off blocks of duration 12*T
%   seconds each)

load(fullfile(ecogPRFrootPath, 'data', 'figure5Data'));
```

Compute spectra of each epoch

```
% We have 3 on-off runs
```

```
numruns = numel(ts);

tmp = cell(1,numruns);
for run = 1:numruns
    tmp{run} = ecogTSeriesVector2TSeriesMatrix(ts{run}, onsets{run});
end

tsmatrix = catcell(2, tmp); clear tmp

epochs    = reshape(1:size(tsmatrix,2), 6, []);
onepochs  = epochs(:,1:2:end); onepochs = onepochs(:);
offepochs = epochs(:,2:2:end); offepochs = offepochs(:);

on.signal  = tsmatrix(:,onepochs);
off.signal = tsmatrix(:,offepochs);
```

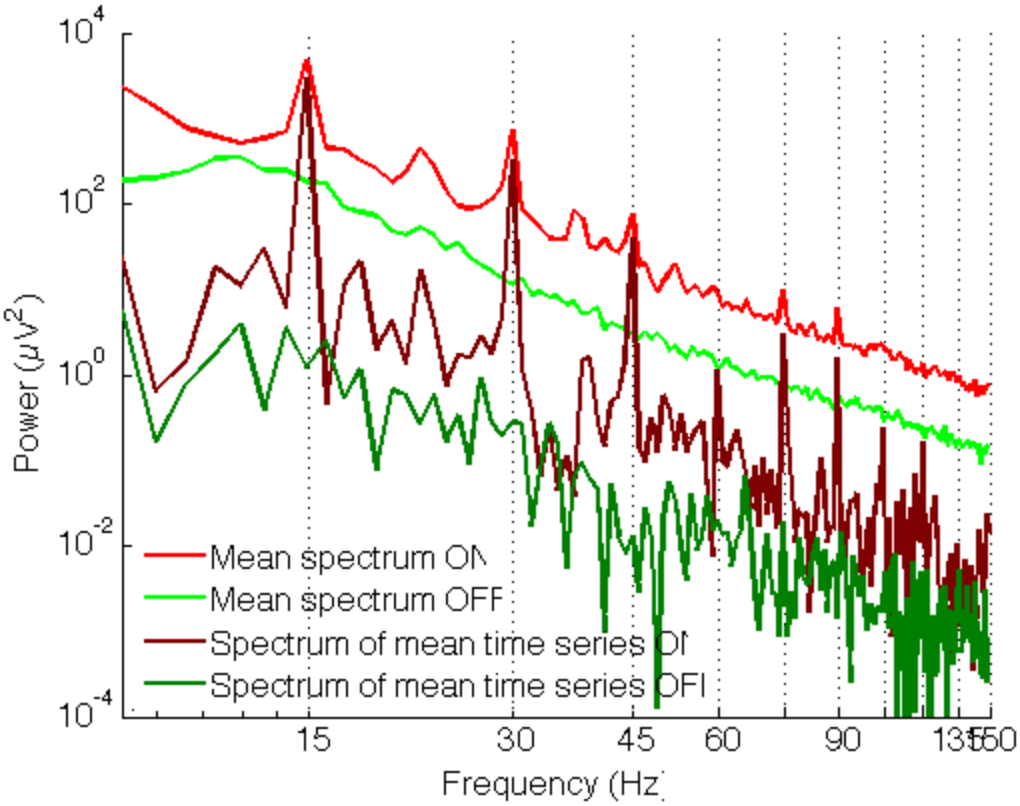
Summarize spectra and time series

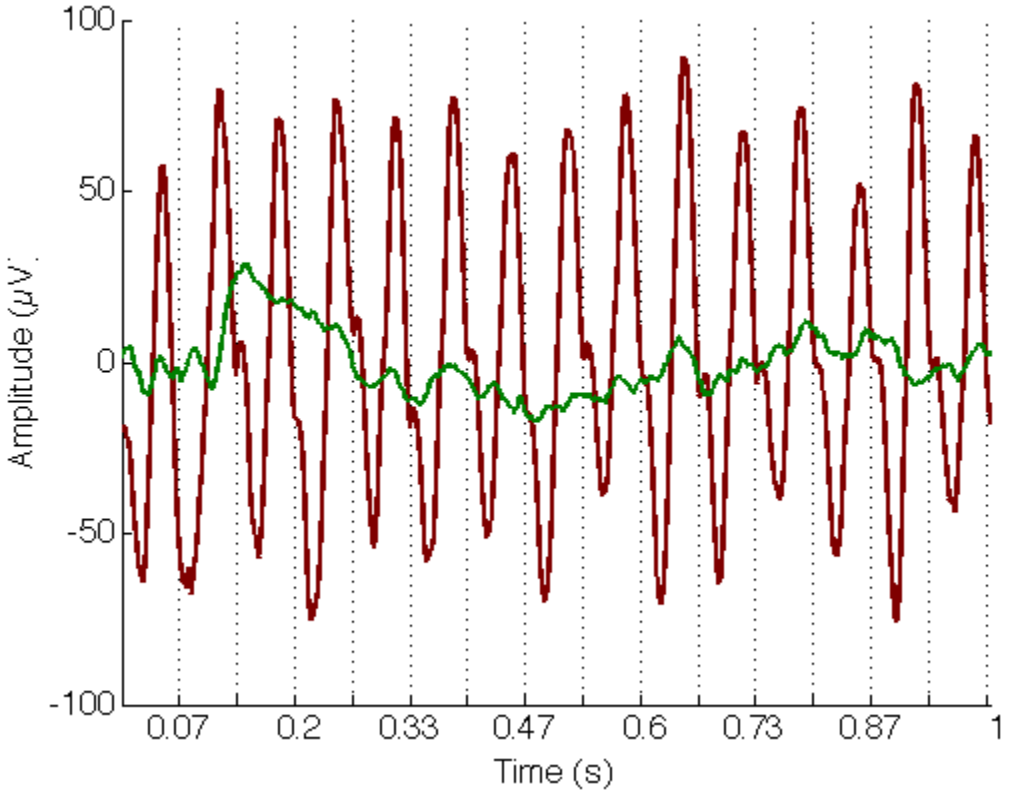
```
epochT = linspace(0, T, size(tsmatrix,1)+1); epochT = epochT(1:end-1);

% compute means across trials
[on, off] = ecogCalcOnOffSpectra(on, off, useHann, calcPower);

% Plot time series and spectra
fH = ecogPlotOnOffSpectra(on, off, epochT, stimF, calcPower);

% %% Save
%
% hgexport(fH(1), fullfile(savepth, 'Figure5_Data_TimeSeries.eps'));
% hgexport(fH(2), fullfile(savepth, 'Figure5_Data_Spectra.eps'));
```


Power (μV^2)
Frequency (Hz)
Mean spectrum ON
Mean spectrum OFF
Spectrum of mean time series ON
Spectrum of mean time series OFF


Amplitude (μV)
Time (s)

Published with MATLAB® 8.0