Average of squared absolute values
Overlap 50%

Average of squared amplitudes
padding
Pure green denotes non-significant points.
Component number
Epoch time range [min max] (msec)
Wavelet cycles (0->FFT, see >> help newtimef)
[set]->Linear coher / [unset]->Phase coher
Bootstrap significance level (Ex: 0.01 -> 1%)
Optional newtimef() arguments (see Help)

Increase # freq bins

padratio = 1
padratio = 2

Plot Event Related Spectral Power
Plot Inter Trial Coherence

Cancel  Help  Ok
Plot IC ERSP

Notice lower frequency limit, but poorer time resolution
Figure 3 and Figure 2: Shows the actual dominant phase of the signal.
To visualize both low and high frequencies

```matlab
freqs = exp(linspace(log(1.5), log(100), 65));
cycles = [linspace(1, 8, 47) ones(1,18)*8 ];
```
Evoked versus induced

- Evoked = ERSP of the average ERP
- Induced = usually standard ERSP
- Real induced
  1) standard ERSP with ERP regressed out of every trial
  2) standard ERSP minus ERSP of the average ERP scaled for averaging effect

In any case, looking at the ITC provides the amount of synchronization in the time-frequency decomposition that account for ERPs.
Advanced time-frequency functions

• Tftopo(): allow visualizing time-frequency power distribution over the scalp
Plot data spectrum using EEGLAB

'winsize', 256  (change FFT window length)
'nfft', 256    (change FFT padding)
'overlap', 128 (change window overlap)
Exercise

- **ALL**
  Start EEGLAB, from the menu load `sample_data/eeglab_data_epochs_ica.set` or your own data (epoch, reject noise if not done already)

- **Novice**
  From the GUI, Plot spectral decomposition with 100% data and 50% overlap (‘overlap’). Try reducing window length (‘winsize’) and FFT length (‘nfft’)

- **Intermediate**
  Same as novice but using a command line call to the `pop_spectopo()` function. Use GUI then history to see a standard call (“eegh”).

- **Advanced**
  Same as novice but using a command line call to the `spectopo()` function.
Exercise - newtimef

• **Novice**
  From the GUI, pick an interesting IC and plot component ERSP. Try changing parameters window size, number of wavelet cycles, padratio,

• **Intermediate**
  From the command line, use newtimef() to tailor your time/frequency output to your liking. Look up the help to try not to remove the baseline, change baseline length and plot in log scale. Enter custom frequencies and cycles (4 slides back).

• **Advanced**
  Compare FFT, the different wavelet methods (see help), and multi-taper methods (use timef function not newtimef). Enter custom frequencies and cycles. Look up newtimef help to compare conditions. Vizualise single-trial timef-frequency power using erpimage.