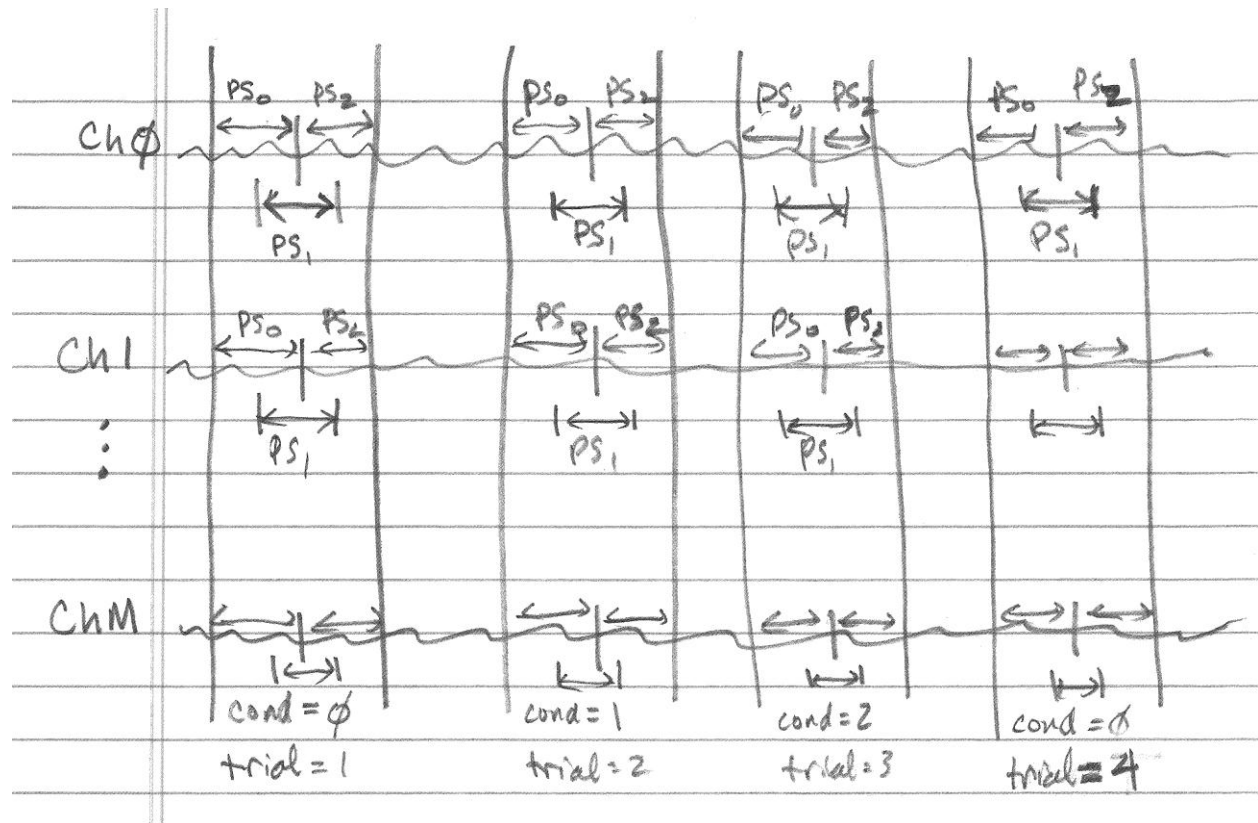
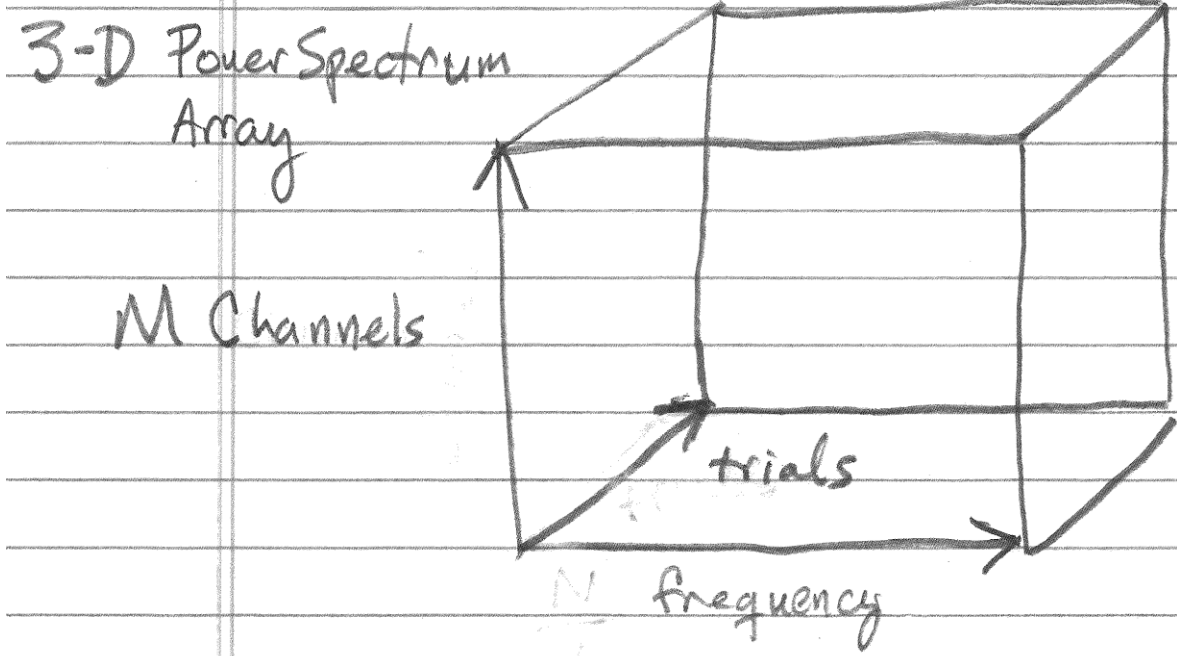


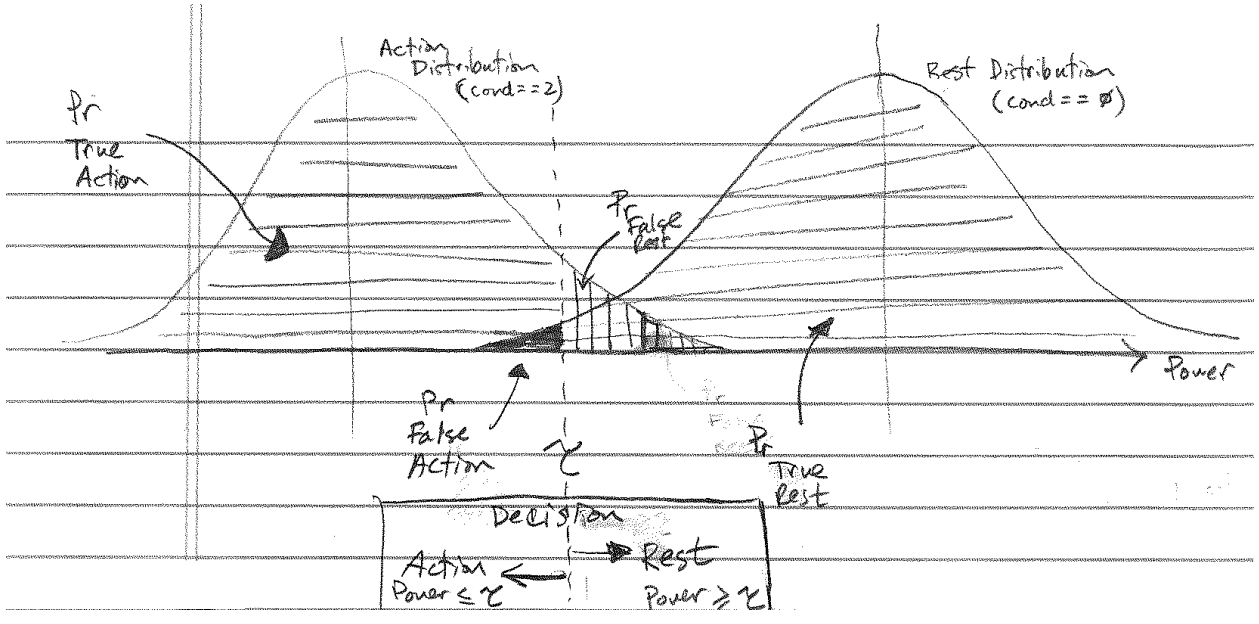
Analyzing BCI2000 dat Files



1. All electrodes are sampled at the Sample Rate for the entire session. These samples are stored in the **signals** variable. The sample rate is stored in **parameters** variable.
2. During the session, the user is prompted to either rest or perform some action. The timing of these conditions is encoded in the **states** variable
3. We want to compute the Power Spectrum (Magnitude² of the Fourier Transform) for every condition for every channel. This Power Spectrum is computed by averaging the power spectra of overlapping sub-segments within the trial.

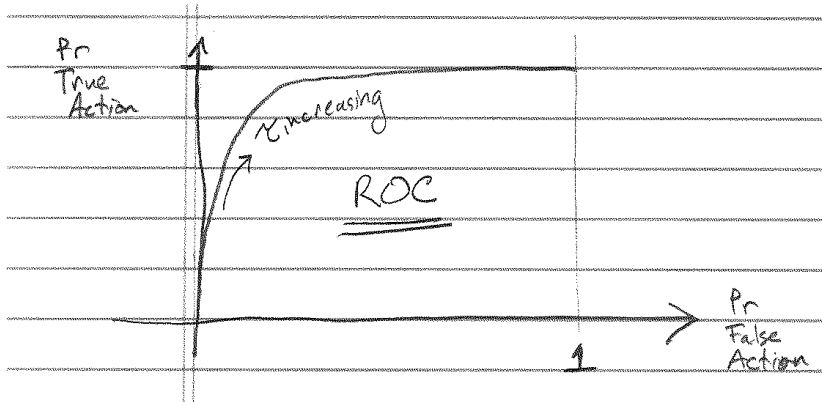


4. You will end up with two 3-Dimensional PowerSpectrum matrices for condition 0 (rest) and condition 2 (action) as shown above.

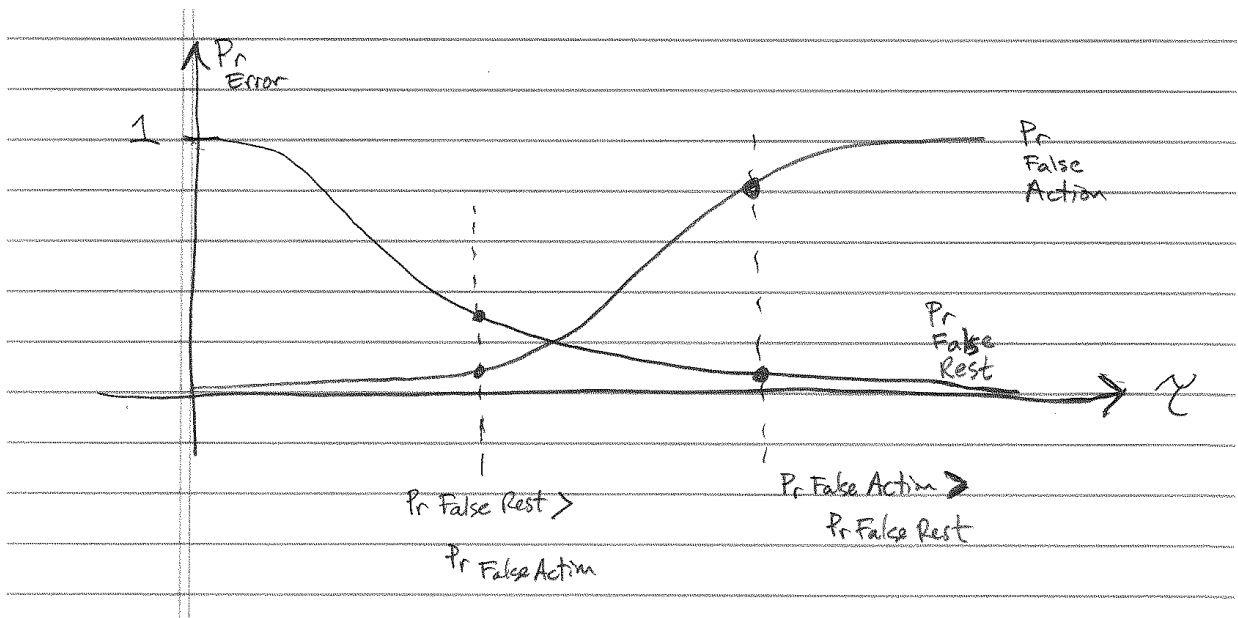


5. For every channel/frequency pair, there is a distribution of the measured power for both conditions. The goal is to find the "best" channel/Frequency pairs.

6. The “best” channel/frequency pairs will have the narrowest distributions (small variance) and the widest separation between the means.



7. To determine the threshold, you need to look at the Receiver Operating Characteristic for the 2 distributions.



8. Another way to look at the threshold settings is to plot both Probability of Error curves vs. Threshold
9. For our application, where we do NOT want to turn on the motor accidentally, where should we set the threshold?