

End-of-term project: Spectra and coherence

Preliminary presentations on Wednesday, December 5 and Friday, December 7, which will give an opportunity to provide feedback. Final write up due Wednesday, December 12, 2018 to Turnitin (via TritonED).

1. **Spectra (20 points).** Choose a pair of time series (or spatial records.) Plot the time series. Compute an estimate of the frequency (or wavenumber) spectrum for each of the data records. Describe the major characteristics of the spectra. Be sure to show your uncertainty estimate.
2. **Coherence (20 points).** Now compute the coherence between the two records. Are the two records statistically coherent? What is the phase relationship between the two records?
3. **Bonus (optional, up to 10 points).** Can you say anything further about the data?
4. **Presentation (10 points).** Write up the method and results clearly and explain your conclusions.

Some comments about this assignment:

- You may choose any ocean or atmosphere data that you like. This could be data that you have looked at for research, or something that your current advisor suggests, or data that you simply pull from the internet. If you have doubts, please come talk to me.
- This exercise will make more sense if you choose data records that could plausibly have a physical connection: e.g. wind and upper ocean temperature, temperature at two different depths, air temperature and ocean temperature.)
- Some candidate data sets include (a) data from the Scripps pier, perhaps including some of the variables that we examined at the start of this quarter, (b) mooring data from the TAO, RAMA, or PIRATA arrays, (c) satellite or model fields. If you aren't sure what to do, please come talk to me.
- The assignment comes in two parts. For December 5/7, please make a first pass at your analysis to present orally in 5-10 minutes. Your presentation should explain the data that you chose, what you hypothesized you might find, and what your results show. This should be completed on your own, without collaborating with your classmates—probably not a big deal, since you should choose different data sets. You may talk to your classmates about the logistics of assembling an oral presentation. I will provide feedback on this, and the class as a whole might also have suggestions.
- On or before Wednesday, December 12, submit a write up of your results, taking into account any feedback that you received on your presentation.