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MAR 670 - Data Analysis Methods

(due ??? April 2008)

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Exercise 6. Cross-Spectral Energy Density and Coherence Functions

Given the coherence/phase matrix for a trio of series

s11	c012	c013
fa21	s22	c023
fa31	fa32	s33

,

where co's= coherence; fa's= phases; s's=auto-spectra.

Compute coherence/phase functions using **l_specter** with section length = 200 (i.e. 101 spectral estimates from f = 0.0cph to f_N = 0.5cph) TAPER - yes; DECIMATION – no; for the indicated series:

A. Synthetic Input Series: sine10.n1
sine10.n2
sine100.n2

- For each "cross-component" in the coherence/phase matrix use **Matlab** to produce a single-page, stack of plots with (top) autospectral energy density (appropriate log axis); (middle) coherence spectra (linear: 0 to 1.0) ; and (3) phase spectra (linear: 180° to + 180°) versus a linear frequency axes between 0 cph and 0.5 cph. Plot the spectral energy on a log axis and the coherence and phase spectra on linear ordinate axes.

- Plot the zero coherence level for the 95% confidence level on each coherence plot; and the 95% confidence interval for the coherence and phase at 0.10cph.

- Discuss your results.

B. Measured Input Series: aprsdb.mhr
bosslp.mhr
bosssp.mhr

- For each "cross component" in the coherence/phase matrix use **Matlab** to produce a single-page, stack of plots with (top) autospectral energy density (appropriate log axis); (middle) coherence spectra (linear: 0 to 1.0) ; and (3) phase spectra (linear: 180° to + 180°) versus a linear frequency axes between 0 cph and 0.5 cph. Plot the spectral energy on a log axis and the coherence and phase spectra on linear ordinate axes.

- Plot the zero coherence level for the 95% confidence level on each coherence plot; and the 95% confidence interval for the coherence and phase at 0.07cph.

- Discuss your results.

C. How do the results for B differ, if the residual SL and SSP records were substituted?