SSA-MTM TOOLKIT: BEST PRACTICES, TIPS & TRICKS

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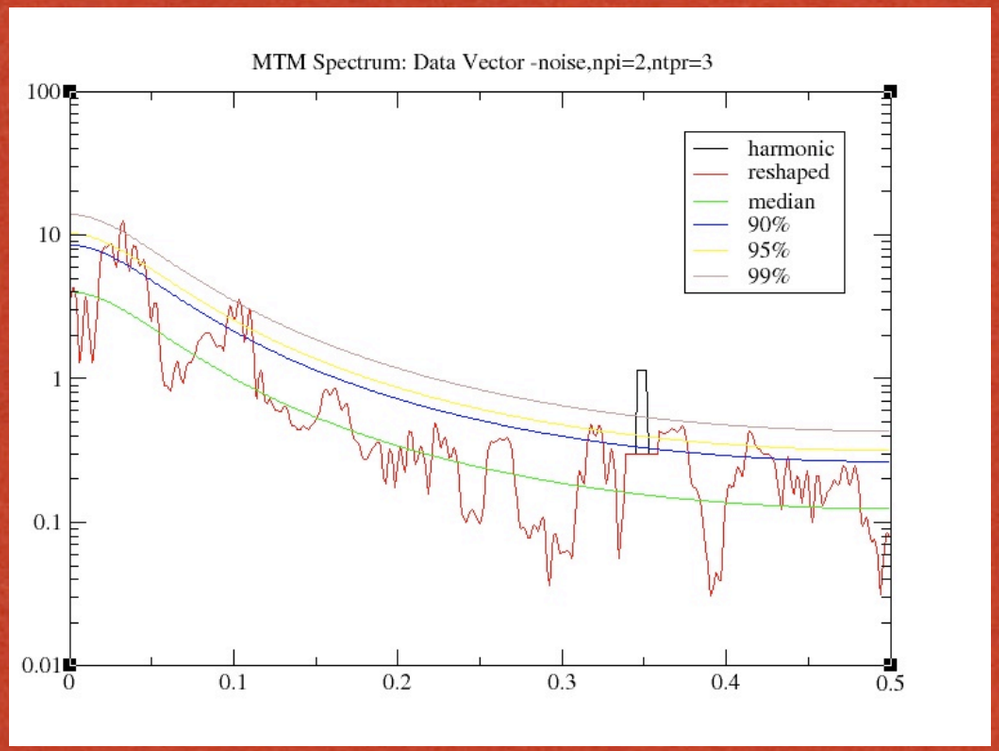
Get http://www.atmos.ucla.edu/tcd/school.tar.gz

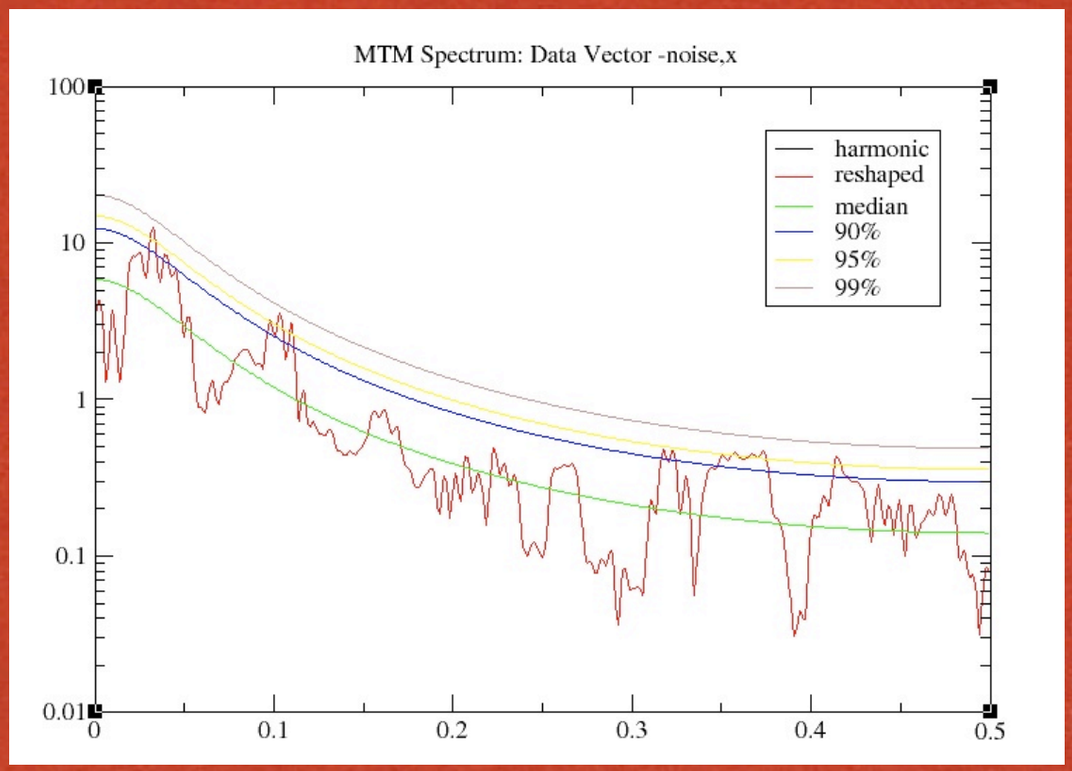
LET'S GET IS STARTED!

- Task: Obtain 14 figures (postscript files) as described in README files in SOI (6 figures), SIGNAL (5 figures) & GAPS (3 figures) directories.

- Detailed instructions for 12 figures in README files.
- The last figure in SIGNAL is a problem with answer provided but no instructions.
- The last figure for GAPS is a problem with answer provided, but no instructions :)
- I'l do some...in SOI 1st, SIGNAL 2nd and GAPS last.

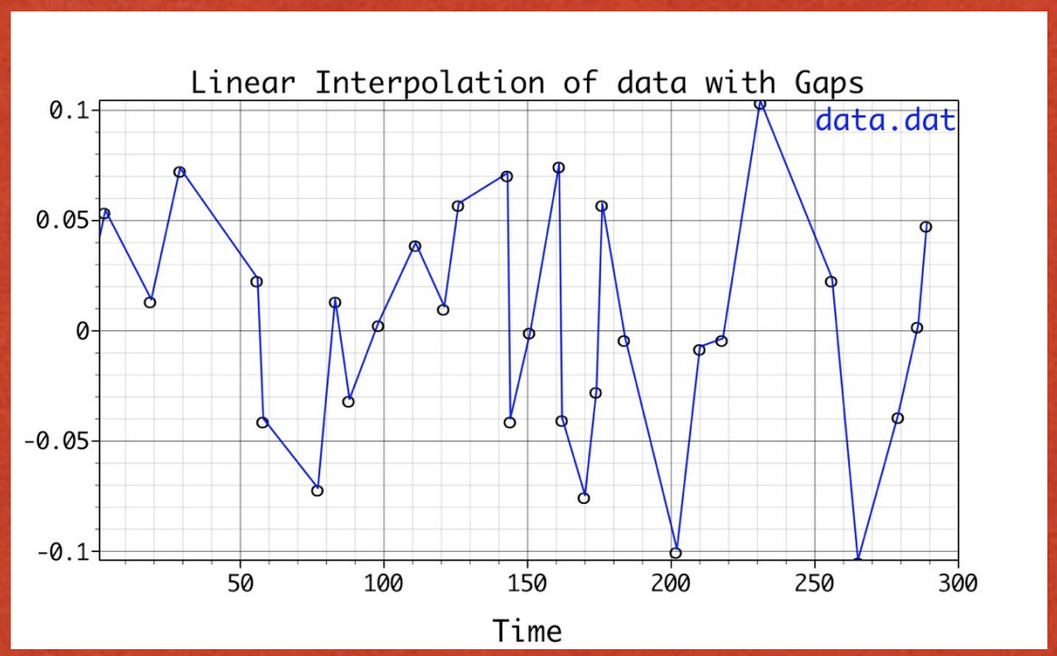
5TH FIGURE FOR SIGNAL

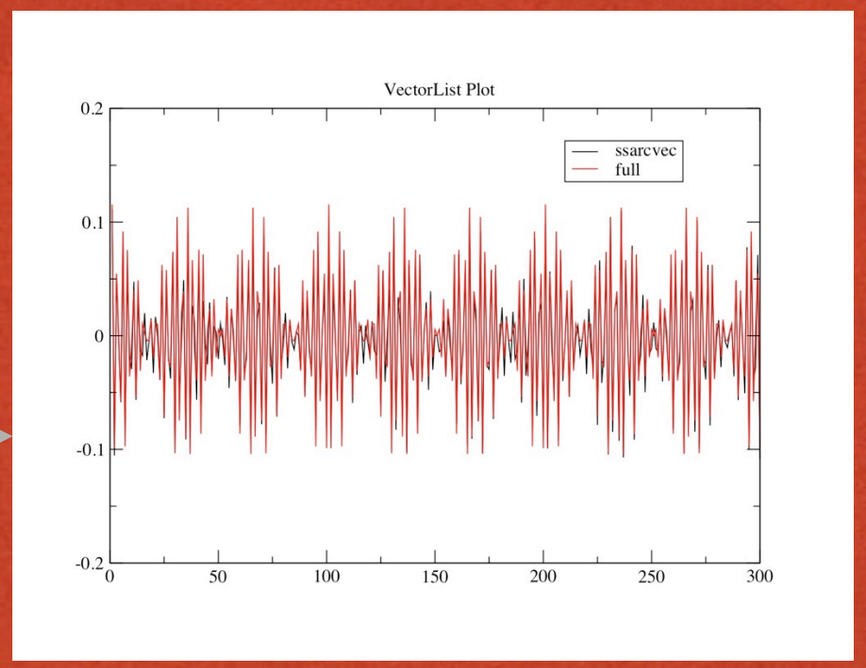




- Find parameter settings for which MTM results of “noise” do not exceed 99% confidnce level!

3RD FIGURE FOR GAPS

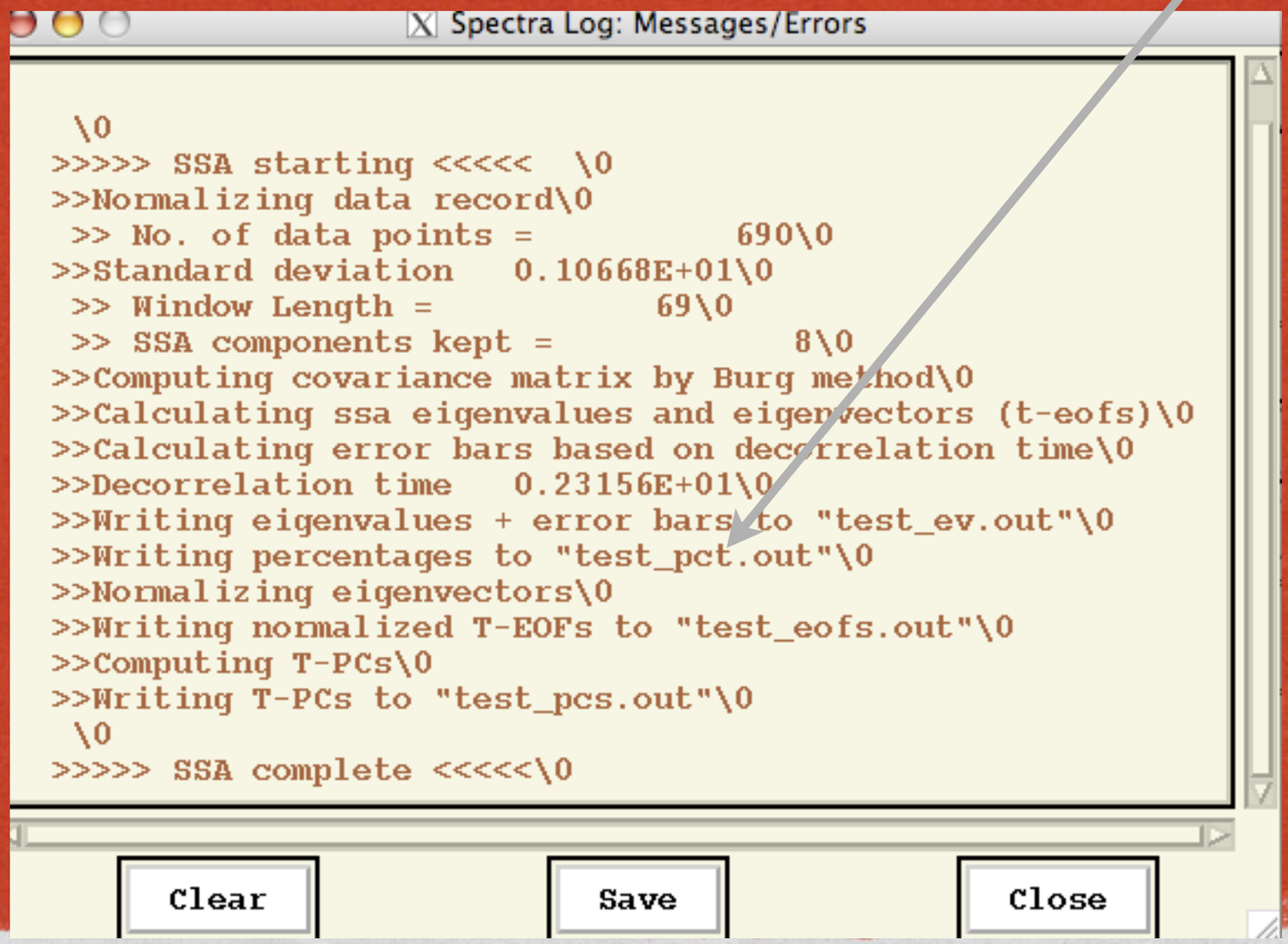




- The plot of gappy data with 3rd party software(Grace can not handle NaN's)
- Task: apply SSA gap-filling to obtain continuos data which is much more beautiful then linear interpolation!

LOG FILE & TMP FILES

- Temporary files are created in the directory where you run the Toolkit:
- used to prepare input for Grace, if strange plots are obtained the files may have been corrupted and have to be removed by hand (rm *.tmp)
- may contain some useful information, check the Log File.



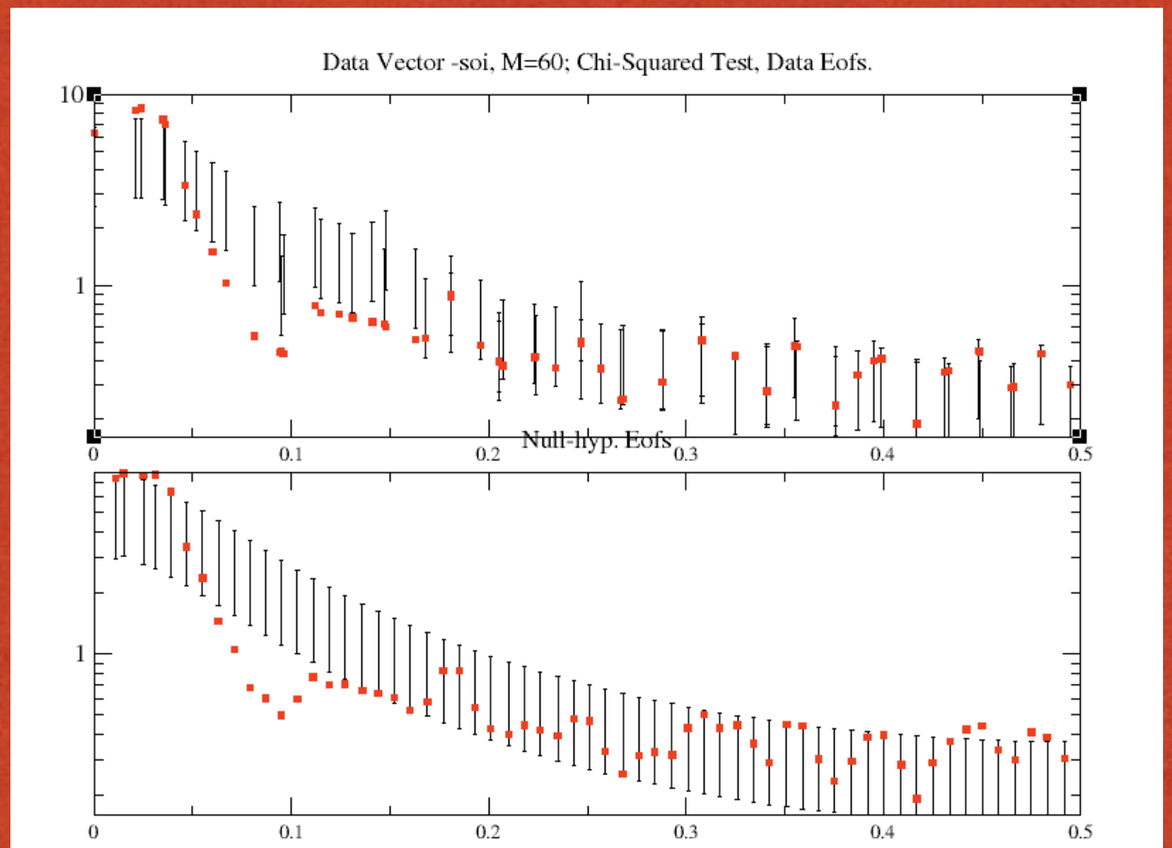
MONTE CARLO SSA

- Spectral view of SSA results (vs. scree diagram) & test against red-noise.

- Complimentary to other pairing tests (phase-qiadrature of EOFS in Plot Options; “Same-frequency” & “Strong FFT” in Test Options)

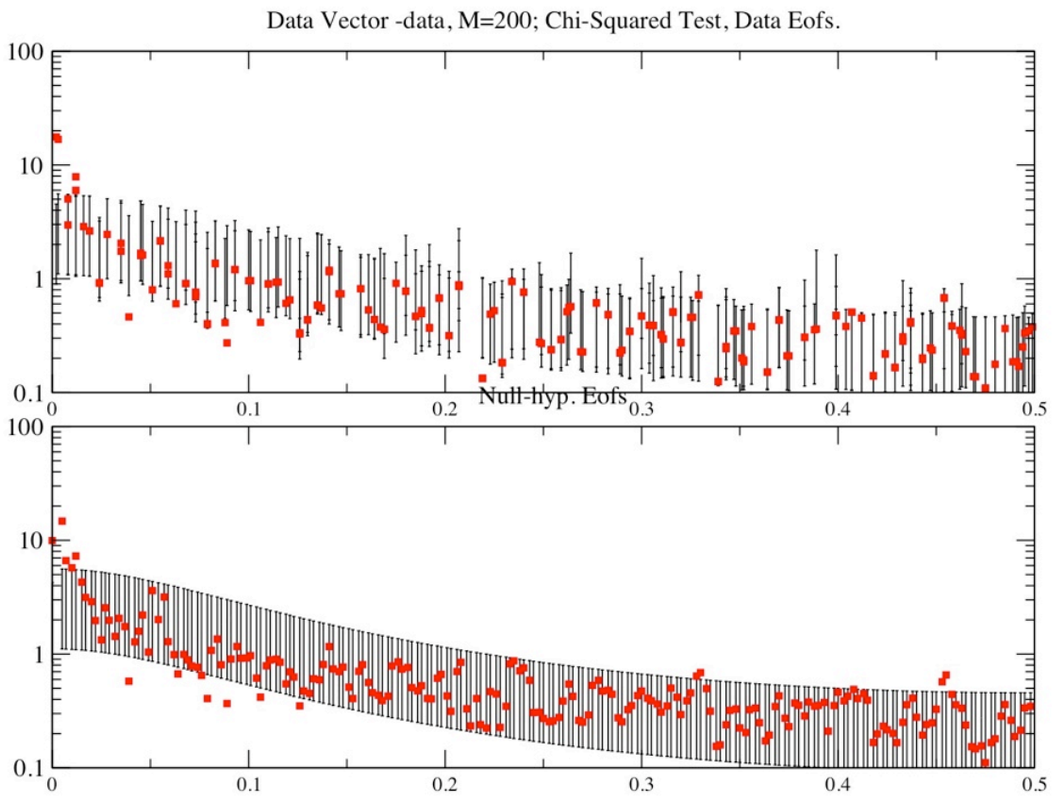
- Distribution of diagonal elements of projected lag-covraiance matrix C of surrogate red-noise time series onto the EOFs of the data time series: E^TCE

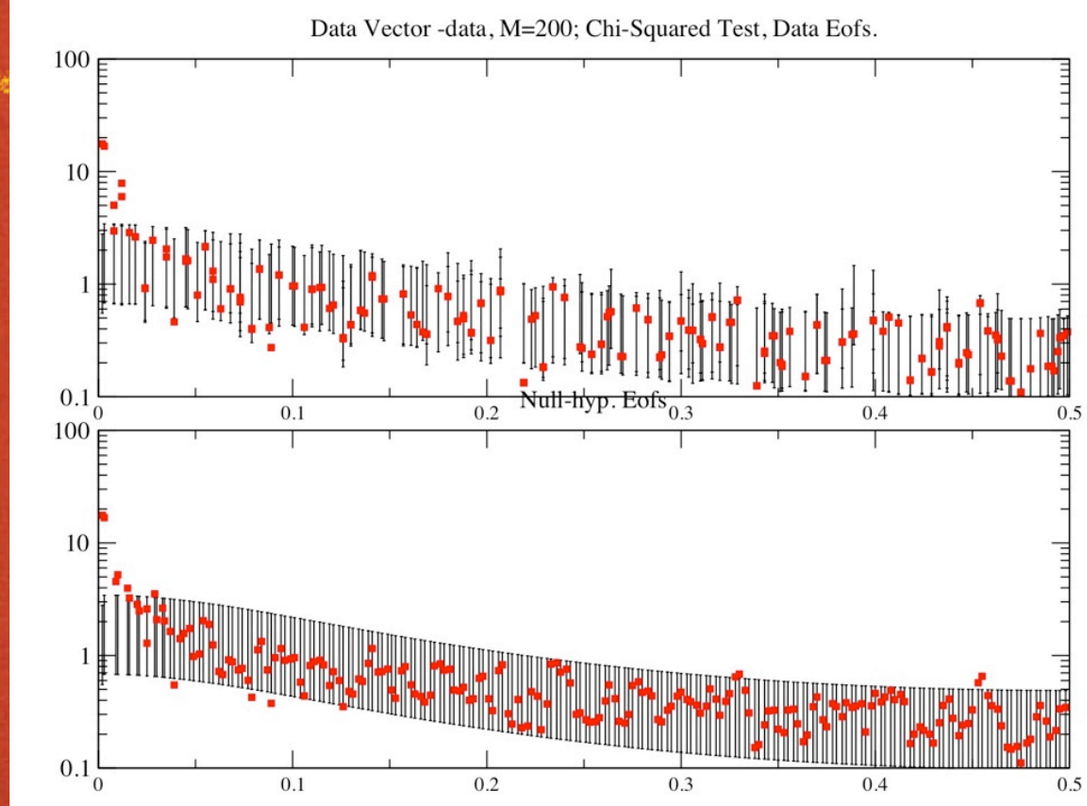
- Projections are plotted against a dominant frequency of EOFs, nedd to look for the pairs above error bars.



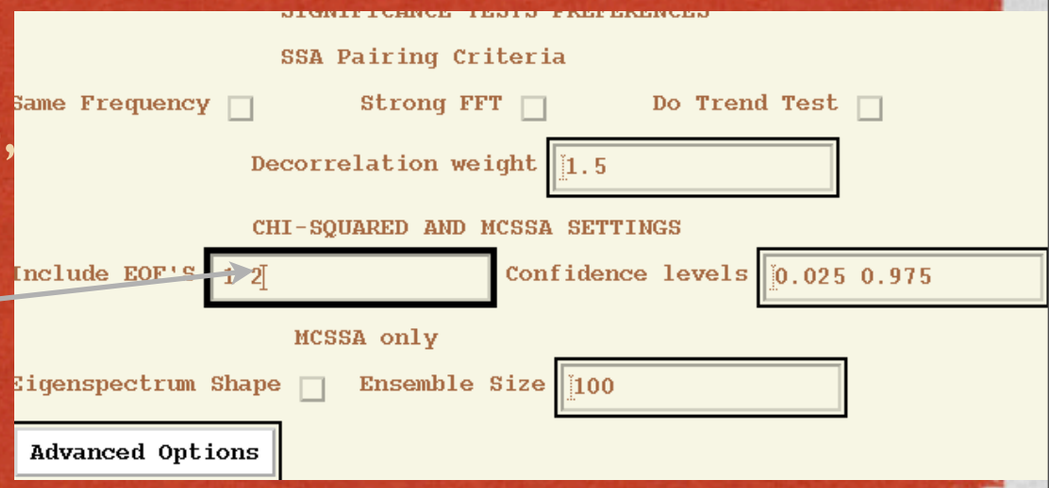
- For lower panel E are EOFs of the expected covariance matrix of red noise, and is useful when testing significance of **leading** SSA components when projection onto data EOFs may give false significance.

"INCLUDE EOFS"





- Useful for MC-SSA when the data contains a very dominant oscillatory mode capturing large variance, shifts the spectrum "up" in low-freq. part
- E.g. set "1 2" in Test Options.

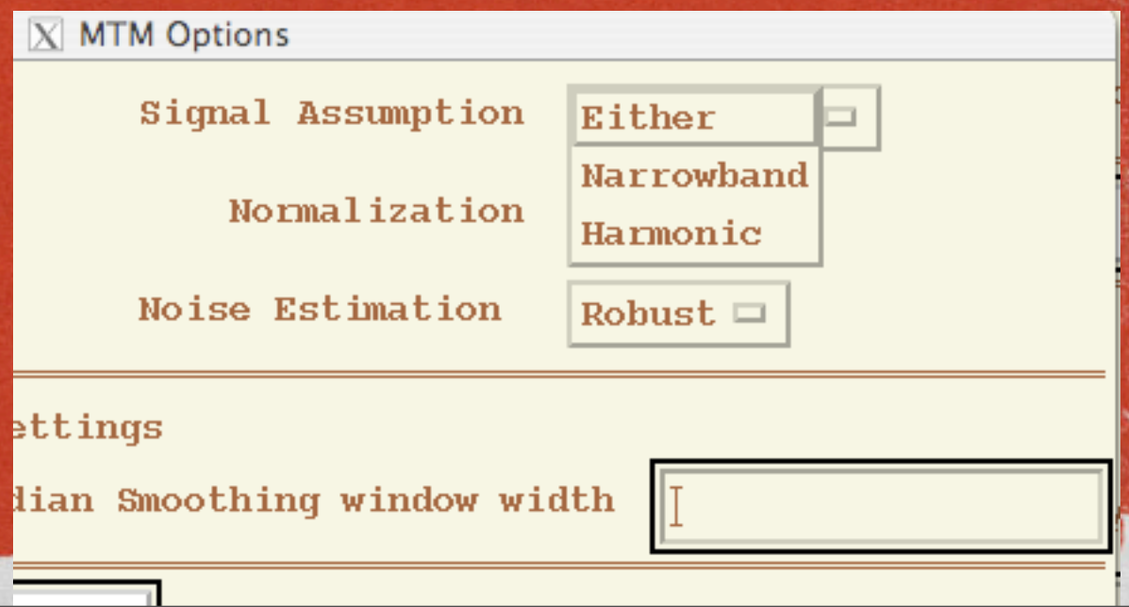


SSA RECONSTRUCTION

- Find significant modes and do time-domain reconstruction to the time series.
- % of variance in test_pct.out temporary file.
- Reconstruction in SSA menu.

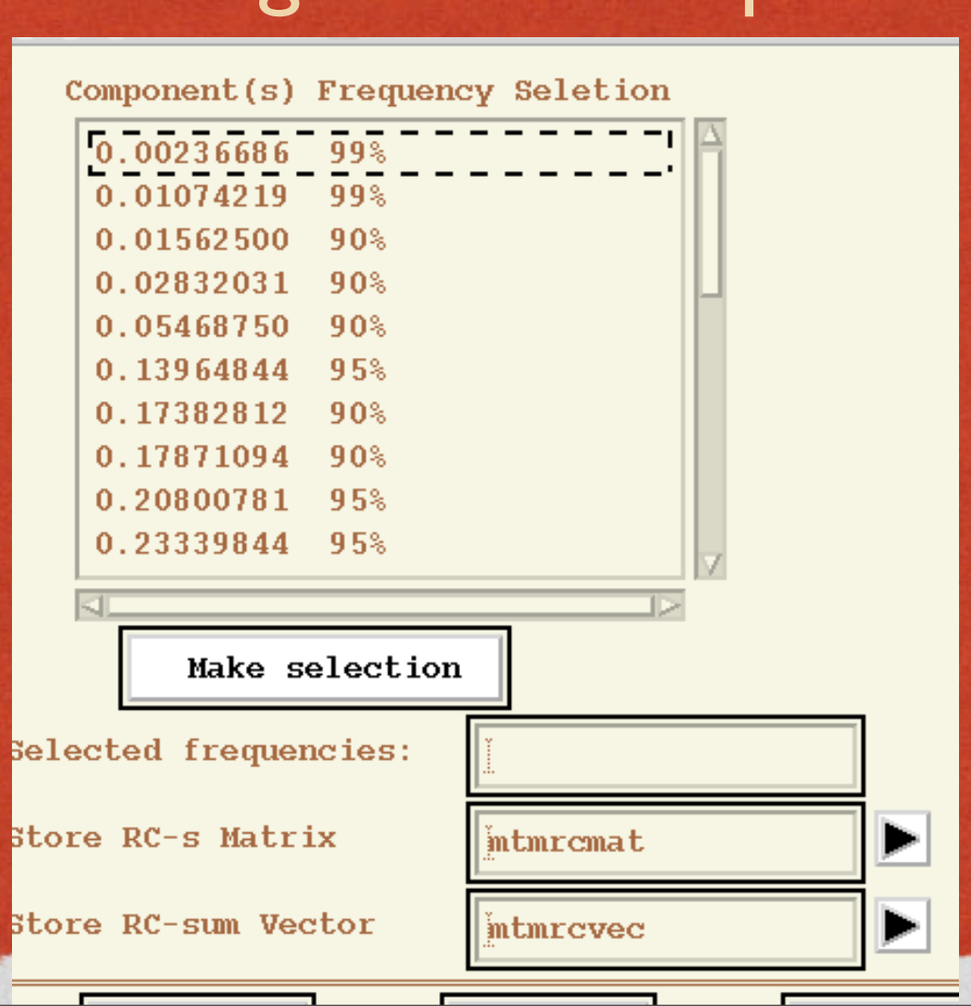
MULTI-TAPER METHOD IN A NUTSHELL

- Classical variance F-test (Thompson) vs. white noise (Harmonic test in Plot Options & 'Signal Assumption')
- Mann & Lee test ("Narrowband" in 'Signal Assumption') vs. red-noise (could be also used for "white-noise" and "locally white" noise); set in 'Null Hypothesis' of MTM Options.
- The two tests are combined when using "Either" in 'Signal Assumption' of MTM Options.



MULTI-TAPER METHOD IN A NUTSHELL (CON'TD)

- If changing sampling from default (=1) use "Get Default Values"
- Time-domain Reconstruction of significant frequencies (Reconstruction in menu).



MULTI-TAPER METHOD IN A NUTSHELL (CON'TD)

- "Reshaping" to visualize significant spectral peaks.