

Documentation of the MATLAB function mtsmoothspec.m

The function's arguments and returned quantities are listed and explained in the help section of the function which is reproduced below. Recommended settings of default values of some of the arguments, and particularly the bandwidth `bw` will be added to a later version of this document.

```
function
[Spec, Freq, SpecVar, MultCohSq, PartCohSq, Gain, Phase, ImpResp, Lag, noiseSpec, noise, noiseACF]=mtsmoothspec(x, align, bw, taprop, prob, maxlag)
% forms the smoothed spectral estimate S of the (m) multiple time series x of size [m,n].
% x is an array with index 1 for the series number and index 2 for the time
% the LAST series is taken as the response to the remainder
% align is a vector of implicit alignment shifts s.
% analysis done on transform of x(t-s); results transformed back
% bw is the desired band-width of the smooth
% taprop is the tapering proportion
% prob is the size of confidence limits and acceptance region for coherencies
% Real Spec is spectrum estimate with indices 1 and 2 for the series and 3 for frequency
% Diagonals hold autospectra, superdiags co-spectra, subdiags quad-spectra
% Order of transform N is determined from series length
% The range of frequency Freq is 0 to 0.5 with intervals of 1/N
% SpecVar has first component the coefficient of variation of the estimated spectrum as fn of freq
% Second component is the equivalent degrees of freedom
% Third and fourth components are lower and upper multiplicative limits for univ. spectra.
% MultCohSq is the squared multiple coherency between series m and the rest
% 1st component is the estimate, 2nd is sign. limit, 3rd, 4th are low,upp limits
% PartCohSq is the squared partial coherency of series m with each of others
% Same components as MultCoh, but second index for other series, third for freq
% Gain is estimated gain of series m from each of others
% 1st component is estimates, 2nd and 3rd are low,upp limits, second index for series
% Phase is estimated phase of series m from each of others
% 1st component is estimates, 2nd and 3rd are low,upp limits, second index for series
% ImpResp is estimated impulse response from -maxlag to +maxlag
% Second component is significance limit
% Lag is vector of lags for the impulse response
% noiseSpec is the estimated spectrum of the noise process
% noise is an estimate of the noise process
% noiseACF is an estimate of the noise acf
%
```