

SpecAverage1D

Basic Summary

SpecAverage1D first takes the ensemble average of spectra of 1D series by treating each row of a 2D field as a separate series (if the field is one-dimensional then that is the only series). It then produces spectra averaged over 10 bins per order of magnitude. It uses a Haar window to reduce spectral leakage. For the lowest order of magnitude of frequencies all the raw points are used. The spectral amplitudes are adjusted so that the sum of the spectral variance equals the real space variance by Parseval's theorem.

Inputs

The two inputs for the function are “field” and “deltaunits”. The first is simply an array of data . The second adjusts the frequency axis to give sensible frequency units; it is the resolution of the series.

Outputs

There are three outputs: a table and two graphs. The table is “spectable” and is the averaged spectra before binning. The first graph is a representation of the “spectable” while the second is a representation of the spectra after binning with a reference line.

Note: This function requires the function Window1D

Example

Input: “intertab1” (1x2895 array of interpolated temperature data from EPICA ice core)
“deltaunits”=276.995

Output:

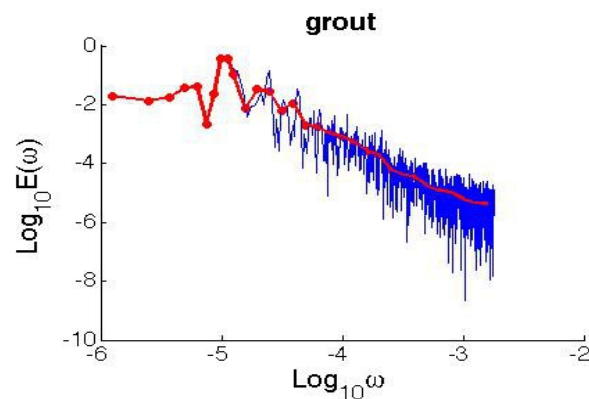
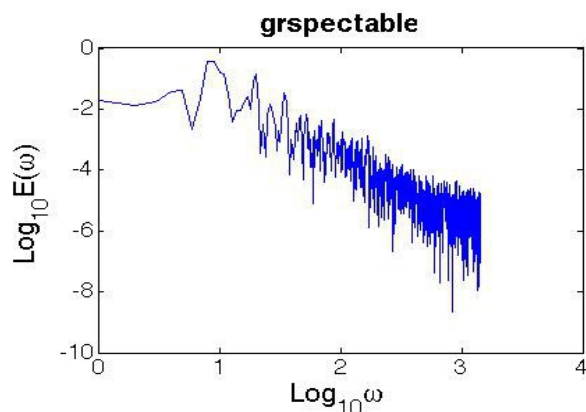
Columns 1 through 9

0	0.3010	0.4771	0.6021	0.6990	0.7782	0.8451	0.9031	0.9542
-1.7106	-1.8796	-1.7476	-1.4319	-1.3713	-2.6658	-1.6396	-0.4444	-0.4360

Columns 10 through 18

1.0000	1.0414	1.0792	1.1139	1.1461	1.1761	1.2041	1.2304	1.2553
-0.7935	-0.8451	-1.4916	-2.4053	-2.0458	-2.0514	-1.8043	-1.5961	-1.9907

etc. (The output was 2x1447 so only a small part is shown here)



Errors

Attempted to access spp(9); index out of bounds because numel(spp)=8.

Error in SpecAverage1D (line 52)

spave(k)=spp(k);

- This error occurs when “lamall” (the number of columns in your field) is less than 18

Warning: Imaginary parts of complex X and/or Y arguments ignored

> In SpecAverage1D at 83

Warning: Imaginary parts of complex X and/or Y arguments ignored

> In SpecAverage1D at 88

- This error occurs when “deltaunits” is negative
- If “deltaunits”=0, grout will not show anything. See *Inputs*