Coeficientes y definición de variables asociadas a las transformadas

Detail and definition from every variable referencing MatLab

Espectrograma de Transformada Corta de Fourier

https://www.mathworks.com/help/signal/ref/spectrogram.html

stf_espectrogramas: spectrogram(prices{:,1},[],[],'power','yaxis')

returns a vector of cyclical frequencies, f, expressed in terms of the sample rate, fs. fs must be the fifth input to spectrogram. To input a sample rate and still use the default values of the preceding optional arguments, specify these arguments as empty, [].

s — Short-time Fourier transform
matrix

Short-time Fourier transform, returned as a matrix. Time increases across the columns of s and frequency increases down the rows, starting from zero.

- If x is a signal of length N_x, then s has k columns, where
- $k = \lfloor (N_x - \text{noverlap})/(\text{window} - \text{noverlap}) \rfloor$ if window is a scalar.
- $k = \lfloor (N_x - \text{noverlap})/(\text{length(window)} - \text{noverlap}) \rfloor$ if window is a vector.

t — Time instants
vector

Time instants, returned as a vector. The time values in t correspond to the midpoint of each segment.

f — Cyclical frequencies
vector

Cyclical frequencies, returned as a vector. f has a length equal to the number of rows of s.

Transformada Wavelet Continua

Continuous 1-D wavelet transform - MATLAB cwt (mathworks.com)

graficas_cwt: [wt,f, coi] = cwt(prices{:,1}); log2(f1/0.1) | log2(coi1/0.1)

returns the continuous wavelet transform (CWT) of x. The CWT is obtained using the analytic Morse wavelet with the symmetry parameter, gamma (γ), equal to 3 and the time-bandwidth product equal to 60. cwt uses 10 voices per octave. The minimum and maximum scales are determined automatically based on the energy spread of the wavelet in frequency and time.

returns the cone of influence, coi, in cycles per sample. Specify a sampling frequency, fs, in hertz, to return the cone of influence in hertz.

wt — Continuous wavelet transform
matrix

Continuous wavelet transform, returned as a matrix of complex values. By default, cwt uses the analytic Morse (3,60) wavelet, where 3 is the symmetry and 60 is the time-bandwidth product. cwt uses 10 voices per octave.

- If x is real-valued, wt is an *Na*-by-*N* matrix, where *Na* is the number of scales, and *N* is the number of samples in x.
- If x is complex-valued, wt is a 3-D matrix, where the first page is the CWT for the positive scales (analytic part or counterclockwise component) and the second page is the CWT for the negative scales (anti-analytic part or clockwise component).

The minimum and maximum scales are determined automatically based on the energy spread of the wavelet in frequency and time.

f — Scale-to-frequency conversions
vector

Scale-to-frequency conversions of the CWT, returned as a vector. If you specify a sampling frequency, fs, then f is in hertz. If you do not specify fs, cwt returns f in cycles per sample. If the input x is complex, the scale-to-frequency conversions apply to both pages of wt.

coi — Cone of influence
array of real numbers | array of durations

Cone of influence for the CWT. If you specify a sampling frequency, fs, the cone of influence is in hertz. If you specify a scalar duration, ts, the cone of influence is an array of durations with the same Format property as ts. If the input x is complex, the cone of influence applies to both pages of wt.

The cone of influence indicates where edge effects occur in the CWT. Due to the edge effects, give less credence to areas that are outside or overlap the cone of influence.

For additional information, see Boundary Effects and the Cone of Influence.

To process the coefficient or the frequencies using this function we need to use the log function to have the exact scale and not a linear one: log2(f1/0.1)

Transformada Wavelet Continua con Ventana Gaussiana

Continuous 1-D wavelet transform - MATLAB cwt (mathworks.com)

graficas_cwt_gauss: s = cwtft(prices{:,1},'wavelet',{'dog',2},'plot');

returns the continuous wavelet transform (CWT) of the real-valued signal x. The wavelet transform is computed for the specified scales using the analyzing wavelet *wname*. scales is a 1-D vector with positive elements. The character vector or string scalar *wname* denotes a wavelet recognized by wavemngr. coefs is a matrix with the number of rows equal to the length of scales and number of columns equal to the length of the input signal. The k-th row of coefs corresponds to the CWT coefficients for the k-th element in the scales vector.

s — Continuous wavelet transform
structure

This class variable contains 7 fields, every field represents and considers the input parameters to calculate the transform, such as variance (omega), the mean of the variations on the signal (meanSig), the type of wavelet (wav) and the derivative (dt). As well the outputs needed to present the transform on a graphic:

cfs — The CWT returned as a matrix
scales — A vector containing the scales that applies to the CWT
frecuencies — A vector of the Cyclical frequencies, returned as a vector. f has a length equal to the number of rows of cfs.

Espectro de Potencia

https://www.mathworks.com/help/signal/ref/pspectrum.html

graficas_espectro_pot: [p,f] = pspectrum(prices);

Analyze signals in the frequency and time-frequency domains

returns the power spectrum of x.

Spectrum, returned as a vector or a matrix. The type and size of the spectrum depends on the value of the type argument:

'power' — p
vector | matrix

contains the power spectrum estimate of each channel of x. In this case, p is of size $Nf \times Nch$, where Nf is the length of f and Nch is the number of channels of x. pspectrum scales the spectrum so that, if the frequency content of a signal falls exactly within a bin, its amplitude in that bin is the true average power of the signal. For example, the average power of a sinusoid is one-half the square of the sinusoid amplitude.

For more details, see Measure Power of Deterministic Periodic Signals.

f — Spectrum frequencies
vector

Spectrum frequencies, returned as a vector. If the input signal contains time information, then f contains frequencies expressed in Hz. If the input signal does not contain time information, then the frequencies are in normalized units of rad/sample.

t — Time values of spectrogram
vector | datetime array | duration array

Time values of spectrogram, returned as a vector of time values in seconds or a duration array. If the input does not have time information, then t contains sample numbers. t contains the time values corresponding to the centers of the data segments used to compute short-time power spectrum estimates.

- If the input to pspectrum is a numeric vector sampled at a set of time instants specified by a numeric, duration, or datetime array, then t has the same type and format as the input time values.
- If the input to pspectrum is a numeric vector with a specified time difference between consecutive samples, then t is a duration array.

Espectrograma

https://www.mathworks.com/help/signal/ref/pspectrum.html

graficas_espectrograma: [p,f,t] = pspectrum(prices,'spectrogram');

Analyze signals in the frequency and time-frequency domains

also returns a vector of time instants corresponding to the centers of the windowed segments used to compute short-time power spectrum estimates.

Spectrum, returned as a vector or a matrix. The type and size of the spectrum depends on the value of the type argument:

'spectrogram' — p
vector | matrix

contains an estimate of the short-term, time-localized power spectrum of x. In this case, p is of size Nf × Nt, where Nf is the length of f and Nt is the length of t.

f — Spectrum frequencies
vector

Spectrum frequencies, returned as a vector. If the input signal contains time information, then f contains frequencies expressed in Hz. If the input signal does not contain time information, then the frequencies are in normalized units of rad/sample.

t — Time values of spectrogram
vector | datetime array | duration array

Time values of spectrogram, returned as a vector of time values in seconds or a duration array. If the input does not have time information, then t contains sample numbers. t contains the time values corresponding to the centers of the data segments used to compute short-time power spectrum estimates.

- If the input to pspectrum is a numeric vector sampled at a set of time instants specified by a numeric, duration, or datetime array, then t has the same type and format as the input time values.
- If the input to pspectrum is a numeric vector with a specified time difference between consecutive samples, then t is a duration array.