

PIWavelet

Generated by Doxygen 1.8.1.2

Thu Mar 21 2013 12:58:16

Contents

| | | |
|----------|--|----------|
| 1 | Namespace Index | 1 |
| 1.1 | Packages | 1 |
| 2 | Class Index | 3 |
| 2.1 | Class Hierarchy | 3 |
| 3 | Class Index | 5 |
| 3.1 | Class List | 5 |
| 4 | File Index | 7 |
| 4.1 | File List | 7 |
| 5 | Namespace Documentation | 9 |
| 5.1 | projects Namespace Reference | 9 |
| 5.2 | projects.piwavelet Namespace Reference | 9 |
| 5.3 | projects.piwavelet.piwavelet Namespace Reference | 9 |
| 5.3.1 | Variable Documentation | 9 |
| 5.3.1.1 | __all__ | 9 |
| 5.3.1.2 | __authors__ | 10 |
| 5.3.1.3 | __data__ | 10 |
| 5.3.1.4 | __email__ | 10 |
| 5.3.1.5 | __name__ | 10 |
| 5.3.1.6 | HOME | 10 |
| 5.3.1.7 | local | 10 |
| 5.4 | projects.piwavelet.piwavelet.piwavelet Namespace Reference | 10 |
| 5.4.1 | Function Documentation | 11 |
| 5.4.1.1 | ar1 | 11 |
| 5.4.1.2 | ar1_spectrum | 11 |
| 5.4.1.3 | cwt | 11 |
| 5.4.1.4 | plotWavelet | 12 |
| 5.4.1.5 | significance | 12 |
| 5.4.2 | Variable Documentation | 12 |
| 5.4.2.1 | __authors__ | 12 |

| | | |
|----------|---|-----------|
| 5.4.2.2 | <code>__data</code> | 12 |
| 5.4.2.3 | <code>__email</code> | 12 |
| 5.4.2.4 | <code>__name</code> | 12 |
| 6 | Class Documentation | 13 |
| 6.1 | <code>projects.piwavelet.piwavelet.piwavelet.DOG</code> Class Reference | 13 |
| 6.1.1 | Detailed Description | 14 |
| 6.1.2 | Constructor & Destructor Documentation | 14 |
| 6.1.2.1 | <code>__init__</code> | 14 |
| 6.1.3 | Member Function Documentation | 14 |
| 6.1.3.1 | <code>coi</code> | 14 |
| 6.1.3.2 | <code>flambda</code> | 14 |
| 6.1.3.3 | <code>psi</code> | 14 |
| 6.1.3.4 | <code>psi_ft</code> | 14 |
| 6.1.3.5 | <code>sup</code> | 14 |
| 6.1.4 | Member Data Documentation | 14 |
| 6.1.4.1 | <code>cdelta</code> | 14 |
| 6.1.4.2 | <code>deltaj0</code> | 14 |
| 6.1.4.3 | <code>dofmin</code> | 14 |
| 6.1.4.4 | <code>gamma</code> | 14 |
| 6.1.4.5 | <code>m</code> | 14 |
| 6.1.4.6 | <code>name</code> | 14 |
| 6.2 | <code>projects.piwavelet.piwavelet.piwavelet.Mexican_hat</code> Class Reference | 15 |
| 6.2.1 | Detailed Description | 15 |
| 6.2.2 | Constructor & Destructor Documentation | 15 |
| 6.2.2.1 | <code>__init__</code> | 15 |
| 6.2.3 | Member Data Documentation | 15 |
| 6.2.3.1 | <code>name</code> | 15 |
| 6.3 | <code>projects.piwavelet.piwavelet.piwavelet.Morlet</code> Class Reference | 15 |
| 6.3.1 | Detailed Description | 16 |
| 6.3.2 | Constructor & Destructor Documentation | 16 |
| 6.3.2.1 | <code>__init__</code> | 16 |
| 6.3.3 | Member Function Documentation | 16 |
| 6.3.3.1 | <code>coi</code> | 16 |
| 6.3.3.2 | <code>flambda</code> | 16 |
| 6.3.3.3 | <code>psi</code> | 16 |
| 6.3.3.4 | <code>psi_ft</code> | 16 |
| 6.3.3.5 | <code>sup</code> | 17 |
| 6.3.4 | Member Data Documentation | 17 |
| 6.3.4.1 | <code>cdelta</code> | 17 |

| | | |
|---------|---|----|
| 6.3.4.2 | deltaj0 | 17 |
| 6.3.4.3 | dofmin | 17 |
| 6.3.4.4 | f0 | 17 |
| 6.3.4.5 | gamma | 17 |
| 6.3.4.6 | name | 17 |
| 6.4 | projects.piwavelet.piwavelet.piwavelet.Paul Class Reference | 17 |
| 6.4.1 | Detailed Description | 18 |
| 6.4.2 | Constructor & Destructor Documentation | 18 |
| 6.4.2.1 | __init__ | 18 |
| 6.4.3 | Member Function Documentation | 18 |
| 6.4.3.1 | coi | 18 |
| 6.4.3.2 | flambda | 18 |
| 6.4.3.3 | psi | 18 |
| 6.4.3.4 | psi_ft | 18 |
| 6.4.3.5 | sup | 18 |
| 6.4.4 | Member Data Documentation | 18 |
| 6.4.4.1 | cdelta | 18 |
| 6.4.4.2 | deltaj0 | 18 |
| 6.4.4.3 | dofmin | 18 |
| 6.4.4.4 | gamma | 18 |
| 6.4.4.5 | m | 18 |
| 6.4.4.6 | name | 18 |
| 6.5 | projects.piwavelet.piwavelet.piwavelet.smooth Class Reference | 19 |
| 6.5.1 | Detailed Description | 19 |
| 6.5.2 | Constructor & Destructor Documentation | 19 |
| 6.5.2.1 | __init__ | 19 |
| 6.5.3 | Member Function Documentation | 19 |
| 6.5.3.1 | __call__ | 19 |
| 6.5.4 | Member Data Documentation | 19 |
| 6.5.4.1 | scale | 19 |
| 6.5.4.2 | wtcPath | 19 |
| 6.6 | projects.piwavelet.piwavelet.piwavelet.waveletCC Class Reference | 19 |
| 6.6.1 | Detailed Description | 20 |
| 6.6.2 | Constructor & Destructor Documentation | 20 |
| 6.6.2.1 | __init__ | 20 |
| 6.6.3 | Member Function Documentation | 20 |
| 6.6.3.1 | cwt | 20 |
| 6.6.3.2 | plotWavelet | 20 |
| 6.6.3.3 | significance | 21 |
| 6.7 | projects.piwavelet.piwavelet.piwavelet.wcoherence Class Reference | 21 |

| | | |
|----------|---|-----------|
| 6.7.1 | Detailed Description | 21 |
| 6.7.2 | Constructor & Destructor Documentation | 22 |
| 6.7.2.1 | __init__ | 22 |
| 6.7.3 | Member Function Documentation | 22 |
| 6.7.3.1 | __call__ | 22 |
| 6.7.3.2 | plot | 22 |
| 6.7.4 | Member Data Documentation | 22 |
| 6.7.4.1 | freqs | 22 |
| 6.7.4.2 | signal1 | 22 |
| 6.7.4.3 | signal2 | 22 |
| 6.7.4.4 | wtcPath | 22 |
| 6.7.4.5 | wtcsig | 22 |
| 6.8 | projects.piwavelet.piwavelet.piwavelet.wcross Class Reference | 22 |
| 6.8.1 | Detailed Description | 23 |
| 6.8.2 | Constructor & Destructor Documentation | 23 |
| 6.8.2.1 | __init__ | 23 |
| 6.8.3 | Member Function Documentation | 23 |
| 6.8.3.1 | __call__ | 23 |
| 6.8.3.2 | plot | 23 |
| 6.8.4 | Member Data Documentation | 23 |
| 6.8.4.1 | freqs | 23 |
| 6.8.4.2 | signal1 | 23 |
| 6.8.4.3 | signal2 | 23 |
| 6.8.4.4 | signif | 23 |
| 6.8.4.5 | wtcPath | 23 |
| 7 | File Documentation | 25 |
| 7.1 | piwavelet/__init__.py File Reference | 25 |
| 7.2 | piwavelet/piwavelet.py File Reference | 25 |

Chapter 1

Namespace Index

1.1 Packages

Here are the packages with brief descriptions (if available):

| | |
|--|----|
| projects | 9 |
| projects.piwavelet | 9 |
| projects.piwavelet.piwavelet | 9 |
| projects.piwavelet.piwavelet.piwavelet | 10 |

Chapter 2

Class Index

2.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

| | |
|--|----|
| projects.piwavelet.piwavelet.piwavelet.DOG | 13 |
| projects.piwavelet.piwavelet.piwavelet.Mexican_hat | 15 |
| projects.piwavelet.piwavelet.piwavelet.Morlet | 15 |
| projects.piwavelet.piwavelet.piwavelet.Paul | 17 |
| projects.piwavelet.piwavelet.piwavelet.smooth | 19 |
| projects.piwavelet.piwavelet.piwavelet.waveletCC | 19 |
| projects.piwavelet.piwavelet.piwavelet.wcoherence | 21 |
| projects.piwavelet.piwavelet.piwavelet.wcross | 22 |

Chapter 3

Class Index

3.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

| | |
|---|----|
| projects.piwavelet.piwavelet.piwavelet.DOG | |
| Implements the derivative of a Guassian wavelet class | 13 |
| projects.piwavelet.piwavelet.piwavelet.Mexican_hat | |
| Implements the Mexican hat wavelet class | 15 |
| projects.piwavelet.piwavelet.piwavelet.Morlet | |
| Implements the Morlet wavelet class | 15 |
| projects.piwavelet.piwavelet.piwavelet.Paul | |
| Implements the Paul wavelet class | 17 |
| projects.piwavelet.piwavelet.piwavelet.smooth | |
| This class is an Python interface for the Smoothing matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses profided by Aslak Grinsted, John C | 19 |
| projects.piwavelet.piwavelet.piwavelet.waveletCC | |
| Continuous wavelet transform of the signal at specified scales | 19 |
| projects.piwavelet.piwavelet.piwavelet.wcoherence | |
| This class is an Python interface for the Wavelet Coherence matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses profided by Aslak Grinsted, John C | 21 |
| projects.piwavelet.piwavelet.piwavelet.wcross | |
| This class is an Python interface for the Cross wavelet Spectrun matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses profided by Aslak Grinsted, John C | 22 |

Chapter 4

File Index

4.1 File List

Here is a list of all files with brief descriptions:

| | |
|---|----|
| piwavelet/ __init__.py | 25 |
| piwavelet/ piwavelet.py | 25 |

Chapter 5

Namespace Documentation

5.1 projects Namespace Reference

Packages

- namespace [piwavelet](#)

5.2 projects.piwavelet Namespace Reference

Packages

- namespace [piwavelet](#)

5.3 projects.piwavelet.piwavelet Namespace Reference

Packages

- namespace [piwavelet](#)

Variables

- string [__name](#) = 'piwavelet'
- string [__authors](#) = 'Eduardo dos Santos Pereira, Regla D. Somoza'
- string [__data](#) = '13/03/2013'
- string [__email](#) = 'pereira.somoza@gmail.com,duthit@gmail.com'
- tuple [HOME](#) = os.path.expanduser('~')
- tuple [local](#) = os.path.dirname(piwavelet.__file__)
- list [__all__](#)

5.3.1 Variable Documentation

5.3.1.1 list projects.piwavelet.piwavelet.__all__

Initial value:

```
1 ['waveletCC', 'Morlet', 'Paul', 'DOG',  
2   'Mexican_hat']
```

5.3.1.2 string `projects.piwavelet.piwavelet.__authors` = 'Eduardo dos Santos Pereira, Regla D. Somoza'

5.3.1.3 string `projects.piwavelet.piwavelet.__data` = '13/03/2013'

5.3.1.4 string `projects.piwavelet.piwavelet.__email` = 'pereira.somoza@gmail.com,duthit@gmail.com'

5.3.1.5 string `projects.piwavelet.piwavelet.__name` = 'piwavelet'

5.3.1.6 tuple `projects.piwavelet.piwavelet.HOME` = `os.path.expanduser('~')`

5.3.1.7 tuple `projects.piwavelet.piwavelet.local` = `os.path.dirname(piwavelet.__file__)`

5.4 projects.piwavelet.piwavelet.piwavelet Namespace Reference

Classes

- class [Morlet](#)
Implements the [Morlet](#) wavelet class.
- class [Paul](#)
Implements the [Paul](#) wavelet class.
- class [DOG](#)
Implements the derivative of a Guassian wavelet class.
- class [Mexican_hat](#)
Implements the Mexican hat wavelet class.
- class [wcoherence](#)
This class is an Python interface for the Wavelet Coherence matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.
- class [wcross](#)
This class is an Python interface for the Cross wavelet Spectrun matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.
- class [smooth](#)
This class is an Python interface for the Smoothing matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.
- class [waveletCC](#)
Continuous wavelet transform of the signal at specified scales.

Functions

- def [ar1](#)
Allen and Smith autoregressive lag-1 autocorrelation alpha.
- def [ar1_spectrum](#)
Lag-1 autoregressive theoretical power spectrum.
- def [cwt](#)
Continuous wavelet transform of the signal at specified scales.
- def [significance](#)
Significance testing for the onde dimensional wavelet transform.
- def [plotWavelet](#)
Plot Wavelet Transfor for one signal.

Variables

- string `__name` = 'piwavelets'
- string `__authors` = 'Eduardo dos Santos Pereira, Regla D. Somoza'
- string `__data` = '13/03/2013'
- string `__email` = 'pereira.somoza@gmail.com,duthit@gmail.com'

5.4.1 Function Documentation

5.4.1.1 `def projects.piwavelet.piwavelet.piwavelet.ar1 (x)`

Allen and Smith autoregressive lag-1 autocorrelation alpha.

In a AR(1) model

$$x(t) - \langle x \rangle = \gamma(x(t-1) - \langle x \rangle) + \alpha z(t) ,$$

where $\langle x \rangle$ is the process mean, and are process parameters and $z(t)$ is a Gaussian unit-variance white noise.

PARAMETERS x (array like) : Univariate time series

RETURNS g (float) : Estimate of the lag-one autocorrelation. a (float) : Estimate of the noise variance [$\text{var}(x) \sim a^2/(1-g^2)$] μ^2 (foat) : Estimated square on the mean of a finite segment of AR(1) noise, mormalized by the process variance.

REFERENCES [1] Allen, M. R. and Smith, L. A. (1996). Monte Carlo SSA: detecting irregular oscillations in the presence of colored noise. Journal of Climate, 9(12), 3373-3404.

5.4.1.2 `def projects.piwavelet.piwavelet.piwavelet.ar1_spectrum (freqs, ar1 = 0 .)`

Lag-1 autoregressive theoretical power spectrum.

PARAMETERS $ar1$ (float) : Lag-1 autoregressive correlation coefficient. $freqs$ (array like) : Frequencies at which to calculate the theoretical power spectrum.

RETURNS P_k (array like) : Theoretical discrete Fourier power spectrum of noise signal.

5.4.1.3 `def projects.piwavelet.piwavelet.piwavelet.cwt (signal, dt = 1 . , dj = 1 . / 12 , s0 = -1 , J = -1 , wavelet = Morlet () , result = None)`

Continuous wavelet transform of the signal at specified scales.

PARAMETERS $signal$ (array like) : Input signal array dt (float) : Sample spacing. dj (float, optional) : Spacing between discrete scales. Default value is 0.25. Smaller values will result in better scale resolution, but slower calculation and plot. $s0$ (float, optional) : Smallest scale of the wavelet. Default value is $2*dt$. J (float, optional) : Number of scales less one. Scales range from $s0$ up to $s0 * 2^{(J * dj)}$, which gives a total of $(J + 1)$ scales. Default is $J = (\log_2(N*dt/s0))/dj$. $wavelet$ (class, optional) : Mother wavelet class. Default is Morlet() $result$ (string, optional) : If set to 'dictionary' returns the result arrays as itens of a dictionary.

RETURNS W (array like) : Wavelet transform according to the selected mother wavelet. Has $(J+1) \times N$ dimensions. sj (array like) : Vector of scale indices given by $sj = s0 * 2^{(j * dj)}$, $j=\{0, 1, ..., J\}$. $freqs$ (array like) : Vector of Fourier frequencies (in 1 / time units) that corresponds to the wavelet scales. coi (array like) : Returns the cone of influence, which is a vector of N points containing the maximum Fourier period of useful information at that particular time. Periods greater than those are subject to edge effects. fft (array like) : Normalized fast Fourier transform of the input signal. fft_freqs (array like): Fourier frequencies (in 1/time units) for the calculated FFT spectrum.

EXAMPLE `mother = wavelet.Morlet(6.) wave, scales, freqs, coi, fft, fftfreqs = wavelet.cwt(var, 0.25, 0.25, 0.5, 28, mother)`

```
5.4.1.4 def projects.piwavelet.piwavelet.piwavelet.plotWavelet ( signal, title, label, units, mother=Morlet(6.), t0=
1.0, dt=1.0, dj=0.25, s0=-1, J=-1, alpha=0.0, slevel=0.95, avg1=15, avg2=20, nameSave
=None )
```

Plot Wavelet Transform for one signal.

PARAMETER: signal : The signal that will be transformed title : Title of the plot label : Label units : unit of the data mother : The Mother Wavelet. Default [Morlet](#) mother wavelet with wavenumber=6 t0 : Initial time step dt : time step dj : Four sub-octaves per octaves s0 : Starting scale, here 6 months J : Seven powers of two with dj sub-octaves alpha: Lag-1 autocorrelation for white noise slevel : Significance level avg1,avg2 : Range of periods to average nameSave : Path plus name to save the plot

```
5.4.1.5 def projects.piwavelet.piwavelet.piwavelet.significance ( signal, dt, scales, sigma_test=0, alpha=0.,
significance_level=0.95, dof=-1, wavelet=Morlet() )
```

Significance testing for the one dimensional wavelet transform.

PARAMETERS signal (array like or float) : Input signal array. If a float number is given, then the variance is assumed to have this value. If an array is given, then its variance is automatically computed. dt (float, optional) : Sample spacing. Default is 1.0. scales (array like) : Vector of scale indices given returned by cwt function. sigma_test (int, optional) : Sets the type of significance test to be performed. Accepted values are 0, 1 or 2. If omitted assume 0.

If set to 0, performs a regular chi-square test, according to Torrence and Compo (1998) equation 18.

If set to 1, performs a time-average test (equation 23). In this case, dof should be set to the number of local wavelet spectra that were averaged together. For the global wavelet spectra it would be dof=N, the number of points in the time-series.

If set to 2, performs a scale-average test (equations 25 to 28). In this case dof should be set to a two element vector [s1, s2], which gives the scale range that were averaged together. If, for example, the average between scales 2 and 8 was taken, then dof=[2, 8]. alpha (float, optional) : Lag-1 autocorrelation, used for the significance levels. Default is 0.0. significance_level (float, optional) : Significance level to use. Default is 0.95. dof (variant, optional) : Degrees of freedom for significance test to be set according to the type set in sigma_test. wavelet (class, optional) : Mother wavelet class. Default is Morlet().

RETURNS signif (array like) : Significance levels as a function of scale. fft_theor (array like): Theoretical red-noise spectrum as a function of period.

5.4.2 Variable Documentation

```
5.4.2.1 string projects.piwavelet.piwavelet.piwavelet.__authors = 'Eduardo dos Santos Pereira, Regla D. Somoza'
```

```
5.4.2.2 string projects.piwavelet.piwavelet.piwavelet.__data = '13/03/2013'
```

```
5.4.2.3 string projects.piwavelet.piwavelet.piwavelet.__email = 'pereira.somoza@gmail.com,duthit@gmail.com'
```

```
5.4.2.4 string projects.piwavelet.piwavelet.piwavelet.__name = 'piwavelets'
```

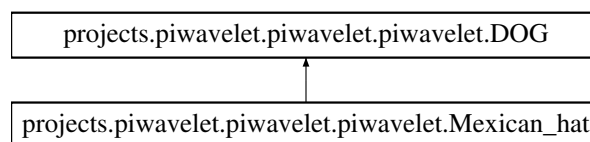
Chapter 6

Class Documentation

6.1 projects.piwavelet.piwavelet.piwavelet.DOG Class Reference

Implements the derivative of a Guassian wavelet class.

Inheritance diagram for projects.piwavelet.piwavelet.piwavelet.DOG:



Public Member Functions

- def `__init__`
- def `psi_ft`
*Fourier transform of the **DOG** wavelet.*
- def `psi`
***DOG** wavelet as described in Torrence and Compo (1998)*
- def `flambda`
Fourier wavelength as of Torrence and Compo (1998)
- def `coi`
e-Folding Time as of Torrence and Compo (1998)
- def `sup`
Wavelet support defined by the e-Folding time.

Public Attributes

- `m`
- `dofmin`
- `cdelta`
- `gamma`
- `deltaj0`

Static Public Attributes

- string `name` = '**DOG**'

6.1.1 Detailed Description

Implements the derivative of a Guassian wavelet class.

Note that the input parameter *f* is the angular frequency and that for *m*=2 the **DOG** becomes the Mexican hat wavelet, which is then default.

6.1.2 Constructor & Destructor Documentation

6.1.2.1 `def projects.piwavelet.piwavelet.piwavelet.DOG.__init__(self, m = 2)`

6.1.3 Member Function Documentation

6.1.3.1 `def projects.piwavelet.piwavelet.piwavelet.DOG.coi(self)`

e-Folding Time as of Torrence and Compo (1998)

6.1.3.2 `def projects.piwavelet.piwavelet.piwavelet.DOG.flambda(self)`

Fourier wavelength as of Torrence and Compo (1998)

6.1.3.3 `def projects.piwavelet.piwavelet.piwavelet.DOG.psi(self, t)`

DOG wavelet as described in Torrence and Compo (1998)

The derivative of a Gaussian of order *n* can be determined using the probabilistic Hermite polynomials. They are explicitly written as: $H_n(x) = 2 \cdot (-n / s) \cdot n! \cdot \sum ((-1) \cdot m) \cdot (2 \cdot 0.5 \cdot x) \cdot (n - 2 \cdot m) / (m! \cdot (n - 2 \cdot m)!)$ or in the recursive form: $H_n(x) = x \cdot H_n(x) - n H_{n-1}(x)$

Source: http://www.ask.com/wiki/Hermite_polynomials

6.1.3.4 `def projects.piwavelet.piwavelet.piwavelet.DOG.psi_ft(self, f)`

Fourier transform of the **DOG** wavelet.

6.1.3.5 `def projects.piwavelet.piwavelet.piwavelet.DOG.sup(self)`

Wavelet support defined by the e-Folding time.

6.1.4 Member Data Documentation

6.1.4.1 `projects.piwavelet.piwavelet.piwavelet.DOG.cdelt`

6.1.4.2 `projects.piwavelet.piwavelet.piwavelet.DOG.deltaj0`

6.1.4.3 `projects.piwavelet.piwavelet.piwavelet.DOG.dofmin`

6.1.4.4 `projects.piwavelet.piwavelet.piwavelet.DOG.gamma`

6.1.4.5 `projects.piwavelet.piwavelet.piwavelet.DOG.m`

6.1.4.6 `string projects.piwavelet.piwavelet.piwavelet.DOG.name = 'DOG' [static]`

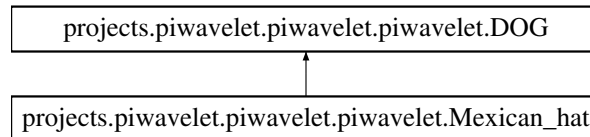
The documentation for this class was generated from the following file:

- [piwavelet/piwavelet.py](#)

6.2 projects.piwavelet.piwavelet.piwavelet.Mexican_hat Class Reference

Implements the Mexican hat wavelet class.

Inheritance diagram for projects.piwavelet.piwavelet.piwavelet.Mexican_hat:



Public Member Functions

- `def __init__`

Static Public Attributes

- string `name` = 'Mexican hat'

Additional Inherited Members

6.2.1 Detailed Description

Implements the Mexican hat wavelet class.

This class inherits the [DOG](#) class using m=2.

6.2.2 Constructor & Destructor Documentation

6.2.2.1 `def projects.piwavelet.piwavelet.piwavelet.Mexican_hat.__init__(self)`

6.2.3 Member Data Documentation

6.2.3.1 `string projects.piwavelet.piwavelet.piwavelet.Mexican_hat.name = 'Mexican hat' [static]`

The documentation for this class was generated from the following file:

- [piwavelet/piwavelet.py](#)

6.3 projects.piwavelet.piwavelet.piwavelet.Morlet Class Reference

Implements the [Morlet](#) wavelet class.

Public Member Functions

- `def __init__`
- `def psi_ft`

- Fourier transform of the approximate [Morlet](#) wavelet.*
 - def [psi](#)
[Morlet](#) wavelet as described in Torrence and Compo (1998)
 - def [flambda](#)
Fourier wavelength as of Torrence and Compo (1998)
 - def [coi](#)
e-Folding Time as of Torrence and Compo (1998)
 - def [sup](#)
Wavelet support defined by the e-Folding time.

Public Attributes

- [f0](#)
- [dofmin](#)
- [cdelta](#)
- [gamma](#)
- [deltaj0](#)

Static Public Attributes

- string [name](#) = '[Morlet](#)'

6.3.1 Detailed Description

Implements the [Morlet](#) wavelet class.

Note that the input parameters *f* and *f0* are angular frequencies. *f0* should be more than 0.8 for this function to be correct, its default value is *f0*=6.

6.3.2 Constructor & Destructor Documentation

6.3.2.1 `def projects.piwavelet.piwavelet.piwavelet.Morlet.__init__(self, f0 = 6.0)`

6.3.3 Member Function Documentation

6.3.3.1 `def projects.piwavelet.piwavelet.piwavelet.Morlet.coi(self)`

e-Folding Time as of Torrence and Compo (1998)

6.3.3.2 `def projects.piwavelet.piwavelet.piwavelet.Morlet.flambda(self)`

Fourier wavelength as of Torrence and Compo (1998)

6.3.3.3 `def projects.piwavelet.piwavelet.piwavelet.Morlet.psi(self, t)`

[Morlet](#) wavelet as described in Torrence and Compo (1998)

6.3.3.4 `def projects.piwavelet.piwavelet.piwavelet.Morlet.psi_ft(self, f)`

Fourier transform of the approximate [Morlet](#) wavelet.

6.3.3.5 `def projects.piwavelet.piwavelet.piwavelet.Morlet.sup (self)`

Wavelet support defined by the e-Folding time.

6.3.4 Member Data Documentation

6.3.4.1 `projects.piwavelet.piwavelet.piwavelet.Morlet.cdelt`

6.3.4.2 `projects.piwavelet.piwavelet.piwavelet.Morlet.deltaj0`

6.3.4.3 `projects.piwavelet.piwavelet.piwavelet.Morlet.dofmin`

6.3.4.4 `projects.piwavelet.piwavelet.piwavelet.Morlet.f0`

6.3.4.5 `projects.piwavelet.piwavelet.piwavelet.Morlet.gamma`

6.3.4.6 `string projects.piwavelet.piwavelet.piwavelet.Morlet.name = 'Morlet' [static]`

The documentation for this class was generated from the following file:

- [piwavelet/piwavelet.py](#)

6.4 projects.piwavelet.piwavelet.piwavelet.Paul Class Reference

Implements the [Paul](#) wavelet class.

Public Member Functions

- `def __init__`
- `def psi_ft`
Fourier transform of the [Paul](#) wavelet.
- `def psi`
[Paul](#) wavelet as described in Torrence and Compo (1998)
- `def flambda`
Fourier wavelength as of Torrence and Compo (1998)
- `def coi`
e-Folding Time as of Torrence and Compo (1998)
- `def sup`
Wavelet support defined by the e-Folding time.

Public Attributes

- [m](#)
- [dofmin](#)
- [cdelta](#)
- [gamma](#)
- [deltaj0](#)

Static Public Attributes

- `string name = 'Paul'`

6.4.1 Detailed Description

Implements the [Paul](#) wavelet class.

Note that the input parameter f is the angular frequency and that the default order for this wavelet is $m=4$.

6.4.2 Constructor & Destructor Documentation

6.4.2.1 `def projects.piwavelet.piwavelet.piwavelet.Paul.__init__(self, m = 4)`

6.4.3 Member Function Documentation

6.4.3.1 `def projects.piwavelet.piwavelet.piwavelet.Paul.coi(self)`

e-Folding Time as of Torrence and Compo (1998)

6.4.3.2 `def projects.piwavelet.piwavelet.piwavelet.Paul.flambda(self)`

Fourier wavelength as of Torrence and Compo (1998)

6.4.3.3 `def projects.piwavelet.piwavelet.piwavelet.Paul.psi(self, t)`

[Paul](#) wavelet as described in Torrence and Compo (1998)

6.4.3.4 `def projects.piwavelet.piwavelet.piwavelet.Paul.psi_ft(self, f)`

Fourier transform of the [Paul](#) wavelet.

6.4.3.5 `def projects.piwavelet.piwavelet.piwavelet.Paul.sup(self)`

Wavelet support defined by the e-Folding time.

6.4.4 Member Data Documentation

6.4.4.1 `projects.piwavelet.piwavelet.piwavelet.Paul.cdelt`

6.4.4.2 `projects.piwavelet.piwavelet.piwavelet.Paul.deltaj0`

6.4.4.3 `projects.piwavelet.piwavelet.piwavelet.Paul.dofmin`

6.4.4.4 `projects.piwavelet.piwavelet.piwavelet.Paul.gamma`

6.4.4.5 `projects.piwavelet.piwavelet.piwavelet.Paul.m`

6.4.4.6 `string projects.piwavelet.piwavelet.piwavelet.Paul.name = 'Paul' [static]`

The documentation for this class was generated from the following file:

- [piwavelet/piwavelet.py](#)

6.5 projects.piwavelet.piwavelet.piwavelet.smooth Class Reference

This class is an Python interface for the Smoothing matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.

Public Member Functions

- `def __init__`
- `def __call__`

Public Attributes

- `wtcPath`
- `scale`

6.5.1 Detailed Description

This class is an Python interface for the Smoothing matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.

Moore and Svetlana Jevrejeva.

<http://noc.ac.uk/using-science/crosswavelet-wavelet-coherence>

However, the Continuous wavelet transform of the signal, in this class, is a pure python function.

Smoothing as in the appendix of Torrence and Webster "Inter decadal changes in the ENSO-Monsoon System" 1998 used in wavelet coherence calculations. Only applicable for the Morlet wavelet.

6.5.2 Constructor & Destructor Documentation

6.5.2.1 `def projects.piwavelet.piwavelet.piwavelet.smooth.__init__(self, wave, dt, period, dj, scale)`

6.5.3 Member Function Documentation

6.5.3.1 `def projects.piwavelet.piwavelet.piwavelet.smooth.__call__(self)`

6.5.4 Member Data Documentation

6.5.4.1 `projects.piwavelet.piwavelet.piwavelet.smooth.scale`

6.5.4.2 `projects.piwavelet.piwavelet.piwavelet.smooth.wtcPath`

The documentation for this class was generated from the following file:

- [piwavelet/piwavelet.py](#)

6.6 projects.piwavelet.piwavelet.piwavelet.waveletCC Class Reference

Continuous wavelet transform of the signal at specified scales.

Public Member Functions

- def `__init__`
- def `cwt`
Continuous wavelet transform of the signal at specified scales.
- def `significance`
Significance testing for the onde dimensional wavelet transform.
- def `plotWavelet`
Plot Wavelet Transfor for one signal.

6.6.1 Detailed Description

Continuous wavelet transform of the signal at specified scales.

6.6.2 Constructor & Destructor Documentation

6.6.2.1 `def projects.piwavelet.piwavelet.piwavelet.waveletCC.__init__(self)`

6.6.3 Member Function Documentation

6.6.3.1 `def projects.piwavelet.piwavelet.piwavelet.waveletCC.cwt(self, signal, dt, dj=0.25, s0=-1, J=-1, wavelet = Morlet())`

Continuous wavelet transform of the signal at specified scales.

PARAMETERS `signal` (array like) : Input signal array `dt` (float) : Sample spacing. `dj` (float, optional) : Spacing between discrete scales. Default value is 0.25. Smaller values will result in better scale resolution, but slower calculation and plot. `s0` (float, optional) : Smallest scale of the wavelet. Default value is 2*dt. `J` (float, optional) : Number of scales less one. Scales range from `s0` up to `s0 * 2**(J * dj)`, which gives a total of (J + 1) scales. Default is `J = (log2(N*dt/s0))/dj`. `wavelet` (class, optional) : Mother wavelet class. Default is `Morlet()`

RETURNS `W` (array like) : Wavelet transform according to the selected mother wavelet. Has (J+1) x N dimensions. `sj` (array like) : Vector of scale indices given by `sj = s0 * 2**(j * dj)`, `j={0, 1, ..., J}`. `freqs` (array like) : Vector of Fourier frequencies (in 1 / time units) that corresponds to the wavelet scales. `coi` (array like) : Returns the cone of influence, which is a vector of N points containing the maximum Fourier period of useful information at that particular time. Periods greater than those are subject to edge effects. `fft` (array like) : Normalized fast Fourier transform of the input signal. `fft_freqs` (array like): Fourier frequencies (in 1/time units) for the calculated FFT spectrum.

EXAMPLE `mother = wavelet.Morlet(6.)` `wave, scales, freqs, coi, fft, fftfreqs = wavelet.cwt(var, 0.25, 0.25, 0.5, 28, mother)`

6.6.3.2 `def projects.piwavelet.piwavelet.piwavelet.waveletCC.plotWavelet(self, signal, title, label, units, mother = Morlet(6.), t0=1.0, dt=1.0, dj=0.25, s0=-1, J=-1, alpha=0.0, slevel=0.95, avg1=15, avg2=20, nameSave=None)`

Plot Wavelet Transfor for one signal.

PARAMETER: `signal` : The signal that will be transformed `title` : Title of the plot `label` : Label `units` : unit of the data `mother` : The Mother Wavelet. Default `Morlet` mother wavelet with wavenumber=6 `t0` : Initial time step `dt` : time step `dj` : Four sub-octaves per octaves `s0` : Starting scale, here 6 months `J` : Seven powers of two with `dj` sub-octaves `alpha`: Lag-1 autocorrelation for white noise `slevel` : Significance level `avg1,avg2` : Range of periods to average `nameSave` : Path plus name to save the plot

```
6.6.3.3 def projects.piwavelet.piwavelet.piwavelet.waveletCC.significance ( self, signal, dt, scales, sigma_test = 0, alpha = 0., significance_level = 0.95, dof = -1, wavelet = Morlet ( ) )
```

Significance testing for the one dimensional wavelet transform.

PARAMETERS signal (array like or float) : Input signal array. If a float number is given, then the variance is assumed to have this value. If an array is given, then its variance is automatically computed. dt (float, optional) : Sample spacing. Default is 1.0. scales (array like) : Vector of scale indices given returned by cwt function. sigma_test (int, optional) : Sets the type of significance test to be performed. Accepted values are 0, 1 or 2. If omitted assume 0.

If set to 0, performs a regular chi-square test, according to Torrence and Compo (1998) equation 18.

If set to 1, performs a time-average test (equation 23). In this case, dof should be set to the number of local wavelet spectra that were averaged together. For the global wavelet spectra it would be dof=N, the number of points in the time-series.

If set to 2, performs a scale-average test (equations 25 to 28). In this case dof should be set to a two element vector [s1, s2], which gives the scale range that were averaged together. If, for example, the average between scales 2 and 8 was taken, then dof=[2, 8]. alpha (float, optional) : Lag-1 autocorrelation, used for the significance levels. Default is 0.0. significance_level (float, optional) : Significance level to use. Default is 0.95. dof (variant, optional) : Degrees of freedom for significance test to be set according to the type set in sigma_test. wavelet (class, optional) : Mother wavelet class. Default is Morlet().

RETURNS signif (array like) : Significance levels as a function of scale. fft_theor (array like): Theoretical red-noise spectrum as a function of period.

The documentation for this class was generated from the following file:

- [piwavelet/piwavelet.py](#)

6.7 projects.piwavelet.piwavelet.piwavelet.wcoherence Class Reference

This class is an Python interface for the Wavelet Coherence matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.

Public Member Functions

- def [__init__](#)
- def [__call__](#)
- def [plot](#)

Plots the wavelet coherence.

Public Attributes

- [wtcPath](#)
- [signal1](#)
- [signal2](#)
- [wtcsig](#)
- [freqs](#)

6.7.1 Detailed Description

This class is an Python interface for the Wavelet Coherence matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.

Moore and Svetlana Jevrejeva.

<http://noc.ac.uk/using-science/crosswavelet-wavelet-coherence>

However, the Continuous wavelet transform of the signal, in this class, is a pure python function.

6.7.2 Constructor & Destructor Documentation

6.7.2.1 `def projects.piwavelet.piwavelet.piwavelet.wcoherence.__init__(self, signal1, signal2)`

6.7.3 Member Function Documentation

6.7.3.1 `def projects.piwavelet.piwavelet.piwavelet.wcoherence.__call__(self)`

6.7.3.2 `def projects.piwavelet.piwavelet.piwavelet.wcoherence.plot(self, t, title, units, levels=None, labels=None, pArrow=None, pSigma=True, gray=None, nameSave=None, scale='log2')`

Plots the wavelet coherence.

PARAMETERS title: Title of the Plot units: (string) Units of the period and time (e.g. 'days') t : array with time gray: Optional - (boolean) True for gray map .

6.7.4 Member Data Documentation

6.7.4.1 `projects.piwavelet.piwavelet.piwavelet.wcoherence.freqs`

6.7.4.2 `projects.piwavelet.piwavelet.piwavelet.wcoherence.signal1`

6.7.4.3 `projects.piwavelet.piwavelet.piwavelet.wcoherence.signal2`

6.7.4.4 `projects.piwavelet.piwavelet.piwavelet.wcoherence.wtcPath`

6.7.4.5 `projects.piwavelet.piwavelet.piwavelet.wcoherence.wtcsig`

The documentation for this class was generated from the following file:

- [piwavelet/piwavelet.py](#)

6.8 projects.piwavelet.piwavelet.piwavelet.wcross Class Reference

This class is an Python interface for the Cross wavelet Spectrun matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.

Public Member Functions

- `def __init__`
- `def __call__`
- `def plot`

Plots the wavelet coherence.

Public Attributes

- `wtcPath`
- `signal1`

- [signal2](#)
- [signif](#)
- [freqs](#)

6.8.1 Detailed Description

This class is an Python interface for the Cross wavelet Spectrun matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses provided by Aslak Grinsted, John C.

Moore and Svetlana Jevrejeva.

<http://noc.ac.uk/using-science/crosswavelet-wavelet-coherence>

However, the Continuous wavelet transform of the signal, in this class, is a pure python function.

6.8.2 Constructor & Destructor Documentation

6.8.2.1 `def projects.piwavelet.piwavelet.piwavelet.wcross.__init__(self, signal1, signal2)`

6.8.3 Member Function Documentation

6.8.3.1 `def projects.piwavelet.piwavelet.piwavelet.wcross.__call__(self)`

6.8.3.2 `def projects.piwavelet.piwavelet.piwavelet.wcross.plot(self, t, title, units, levels=None, labels=None, pArrow=None, pSigma=True, gray=None, nameSave=None, scale='log2')`

Plots the wavelet coherence.

PARAMETERS title: Title of the Plot units: (string) Units of the period and time (e.g. 'days') t : array with time gray: Optional - (boolean) True for gray map .

6.8.4 Member Data Documentation

6.8.4.1 `projects.piwavelet.piwavelet.piwavelet.wcross.freqs`

6.8.4.2 `projects.piwavelet.piwavelet.piwavelet.wcross.signal1`

6.8.4.3 `projects.piwavelet.piwavelet.piwavelet.wcross.signal2`

6.8.4.4 `projects.piwavelet.piwavelet.piwavelet.wcross.signif`

6.8.4.5 `projects.piwavelet.piwavelet.piwavelet.wcross.wtcPath`

The documentation for this class was generated from the following file:

- [piwavelet/piwavelet.py](#)

Chapter 7

File Documentation

7.1 piwavelet/__init__.py File Reference

Packages

- namespace [projects.piwavelet.piwavelet](#)

Variables

- string [projects.piwavelet.piwavelet.__name](#) = 'piwavelet'
- string [projects.piwavelet.piwavelet.__authors](#) = 'Eduardo dos Santos Pereira, Regla D. Somoza'
- string [projects.piwavelet.piwavelet.__data](#) = '13/03/2013'
- string [projects.piwavelet.piwavelet.__email](#) = 'pereira.somoza@gmail.com,duthit@gmail.com'
- tuple [projects.piwavelet.piwavelet.HOME](#) = os.path.expanduser('~')
- tuple [projects.piwavelet.piwavelet.local](#) = os.path.dirname(piwavelet.__file__)
- list [projects.piwavelet.piwavelet.__all__](#)

7.2 piwavelet/piwavelet.py File Reference

Classes

- class [projects.piwavelet.piwavelet.piwavelet.Morlet](#)
*Implements the **Morlet** wavelet class.*
- class [projects.piwavelet.piwavelet.piwavelet.Paul](#)
*Implements the **Paul** wavelet class.*
- class [projects.piwavelet.piwavelet.piwavelet.DOG](#)
Implements the derivative of a Guassian wavelet class.
- class [projects.piwavelet.piwavelet.piwavelet.Mexican_hat](#)
Implements the Mexican hat wavelet class.
- class [projects.piwavelet.piwavelet.piwavelet.wcoherence](#)
This class is an Python interface for the Wavelet Coherence matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses profided by Aslak Grinsted, John C.
- class [projects.piwavelet.piwavelet.piwavelet.wcross](#)
This class is an Python interface for the Cross wavelet Spectrun matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses profided by Aslak Grinsted, John C.
- class [projects.piwavelet.piwavelet.piwavelet.smooth](#)
This class is an Python interface for the Smoothing matlab functions of the package for wavelet, cross-wavelet and coherence-wavelet analyses profided by Aslak Grinsted, John C.

- class `projects.piwavelet.piwavelet.piwavelet.waveletCC`
Continuous wavelet transform of the signal at specified scales.

Packages

- namespace `projects.piwavelet.piwavelet.piwavelet`

Functions

- def `projects.piwavelet.piwavelet.piwavelet.ar1`
Allen and Smith autoregressive lag-1 autocorrelation alpha.
- def `projects.piwavelet.piwavelet.piwavelet.ar1_spectrum`
Lag-1 autoregressive theoretical power spectrum.
- def `projects.piwavelet.piwavelet.piwavelet.cwt`
Continuous wavelet transform of the signal at specified scales.
- def `projects.piwavelet.piwavelet.piwavelet.significance`
Significance testing for the onde dimensional wavelet transform.
- def `projects.piwavelet.piwavelet.piwavelet.plotWavelet`
Plot Wavelet Transfor for one signal.

Variables

- string `projects.piwavelet.piwavelet.piwavelet.__name` = 'piwavelets'
- string `projects.piwavelet.piwavelet.piwavelet.__authors` = 'Eduardo dos Santos Pereira, Regla D. Somoza'
- string `projects.piwavelet.piwavelet.piwavelet.__data` = '13/03/2013'
- string `projects.piwavelet.piwavelet.piwavelet.__email` = 'pereira.somoza@gmail.com,duthit@gmail.com'

Index

- `__all__`
 - projects::piwavelet::piwavelet, 9
- `__authors__`
 - projects::piwavelet::piwavelet, 9
 - projects::piwavelet::piwavelet::piwavelet, 12
- `__call__`
 - projects::piwavelet::piwavelet::piwavelet::smooth, 19
 - projects::piwavelet::piwavelet::piwavelet::wcoherence,dofmin 22
 - projects::piwavelet::piwavelet::piwavelet::wcross, 23
- `__data__`
 - projects::piwavelet::piwavelet, 10
 - projects::piwavelet::piwavelet::piwavelet, 12
- `__email__`
 - projects::piwavelet::piwavelet, 10
 - projects::piwavelet::piwavelet::piwavelet, 12
- `__init__`
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Mexican_hat, 15
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 16
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
 - projects::piwavelet::piwavelet::piwavelet::smooth, 19
 - projects::piwavelet::piwavelet::piwavelet::waveletC-C, 20
 - projects::piwavelet::piwavelet::piwavelet::wcoherence, 22
 - projects::piwavelet::piwavelet::piwavelet::wcross, 23
- `__name__`
 - projects::piwavelet::piwavelet, 10
 - projects::piwavelet::piwavelet::piwavelet, 12
- `ar1`
 - projects::piwavelet::piwavelet::piwavelet, 11
- `ar1_spectrum`
 - projects::piwavelet::piwavelet::piwavelet, 11
- `cdelta`
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 17
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
- `coi`
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 16
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
- `cwt`
- projects::piwavelet::piwavelet::piwavelet, 11
- projects::piwavelet::piwavelet::piwavelet::waveletC-C, 20
- `deltaJ0`
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 17
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
- projects::piwavelet::piwavelet::piwavelet::DOG, 14
- projects::piwavelet::piwavelet::piwavelet::Morlet, 17
- projects::piwavelet::piwavelet::piwavelet::Paul, 18
- `f0`
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 17
- `flambda`
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 16
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
- `freqs`
 - projects::piwavelet::piwavelet::piwavelet::wcoherence, 22
 - projects::piwavelet::piwavelet::piwavelet::wcross, 23
- `gamma`
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 17
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
- `HOME`
 - projects::piwavelet::piwavelet, 10
- `local`
 - projects::piwavelet::piwavelet, 10
- `m`
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
- `name`
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::piwavelet::Mexican_hat, 15
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 17
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
- piwavelet/___init__.py, 25
- piwavelet/piwavelet.py, 25
- `plot`

- projects::piwavelet::piwavelet::piwavelet::wcoherence, 22
 - projects::piwavelet::piwavelet::piwavelet::wcross, 23
- plotWavelet
 - projects::piwavelet::piwavelet::piwavelet, 11
 - projects::piwavelet::piwavelet::piwavelet::waveletC-C, 20
- projects, 9
- projects.piwavelet, 9
- projects.piwavelet.piwavelet, 9
- projects.piwavelet.piwavelet.piwavelet, 10
- projects.piwavelet.piwavelet.piwavelet.DOG, 13
- projects.piwavelet.piwavelet.piwavelet.Mexican_hat, 15
- projects.piwavelet.piwavelet.piwavelet.Morlet, 15
- projects.piwavelet.piwavelet.piwavelet.Paul, 17
- projects.piwavelet.piwavelet.piwavelet.smooth, 19
- projects.piwavelet.piwavelet.piwavelet.waveletCC, 19
- projects.piwavelet.piwavelet.piwavelet.wcoherence, 21
- projects.piwavelet.piwavelet.piwavelet.wcross, 22
- projects::piwavelet::piwavelet
 - __all__, 9
 - __authors__, 9
 - __data__, 10
 - __email__, 10
 - __name__, 10
 - HOME, 10
 - local, 10
- projects::piwavelet::piwavelet::piwavelet
 - __authors__, 12
 - __data__, 12
 - __email__, 12
 - __name__, 12
 - ar1, 11
 - ar1_spectrum, 11
 - cwt, 11
 - plotWavelet, 11
 - significance, 12
- projects::piwavelet::piwavelet::piwavelet::DOG
 - __init__, 14
 - cdelta, 14
 - coi, 14
 - deltaj0, 14
 - dofmin, 14
 - flambda, 14
 - gamma, 14
 - m, 14
 - name, 14
 - psi, 14
 - psi_ft, 14
 - sup, 14
- projects::piwavelet::piwavelet::piwavelet::Mexican_hat
 - __init__, 15
 - name, 15
- projects::piwavelet::piwavelet::piwavelet::Morlet
 - __init__, 16
 - cdelta, 17
 - coi, 16
 - deltaj0, 17
 - dofmin, 17
 - f0, 17
 - flambda, 16
 - gamma, 17
 - name, 17
 - psi, 16
 - psi_ft, 16
 - sup, 16
- projects::piwavelet::piwavelet::piwavelet::Paul
 - __init__, 18
 - cdelta, 18
 - coi, 18
 - deltaj0, 18
 - dofmin, 18
 - flambda, 18
 - gamma, 18
 - m, 18
 - name, 18
 - psi, 18
 - psi_ft, 18
 - sup, 18
- projects::piwavelet::piwavelet::piwavelet::smooth
 - __call__, 19
 - __init__, 19
 - scale, 19
 - wtcPath, 19
- projects::piwavelet::piwavelet::piwavelet::waveletCC
 - __init__, 20
 - cwt, 20
 - plotWavelet, 20
 - significance, 20
- projects::piwavelet::piwavelet::piwavelet::wcoherence
 - __call__, 22
 - __init__, 22
 - freqs, 22
 - plot, 22
 - signal1, 22
 - signal2, 22
 - wtcPath, 22
 - wtcsig, 22
- projects::piwavelet::piwavelet::piwavelet::wcross
 - __call__, 23
 - __init__, 23
 - freqs, 23
 - plot, 23
 - signal1, 23
 - signal2, 23
 - signif, 23
 - wtcPath, 23
- psi
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 16
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18
- psi_ft
 - projects::piwavelet::piwavelet::piwavelet::DOG, 14
 - projects::piwavelet::piwavelet::piwavelet::Morlet, 16
 - projects::piwavelet::piwavelet::piwavelet::Paul, 18

scale
 projects::piwavelet::piwavelet::piwavelet::smooth,
 19

signal1
 projects::piwavelet::piwavelet::piwavelet::wcoherence,
 22
 projects::piwavelet::piwavelet::piwavelet::wcross,
 23

signal2
 projects::piwavelet::piwavelet::piwavelet::wcoherence,
 22
 projects::piwavelet::piwavelet::piwavelet::wcross,
 23

signif
 projects::piwavelet::piwavelet::piwavelet::wcross,
 23

significance
 projects::piwavelet::piwavelet::piwavelet, 12
 projects::piwavelet::piwavelet::piwavelet::waveletC-
 C, 20

sup
 projects::piwavelet::piwavelet::piwavelet::DOG, 14
 projects::piwavelet::piwavelet::piwavelet::Morlet, 16
 projects::piwavelet::piwavelet::piwavelet::Paul, 18

wtcPath
 projects::piwavelet::piwavelet::piwavelet::smooth,
 19
 projects::piwavelet::piwavelet::piwavelet::wcoherence,
 22
 projects::piwavelet::piwavelet::piwavelet::wcross,
 23

wtcsig
 projects::piwavelet::piwavelet::piwavelet::wcoherence,
 22