
gccestimating

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CONTENTS:

1	Indices and tables	7
	Python Module Index	9
	Index	11

Generalized Cross Correlation Estimators.

Instantiation Signatures:

- `gcc = GCC(sig1, sig2, fftlen)`
- `gcc = GCC.from_spectra(spec1, spec2, onesided=True)`

Estimators:

`gcc.cc()`, `gcc.roth()`, `gcc.scot()`, `gcc.phat()`, `gcc.ht()`

`gcc.gamma12()`

class `gcc estimating.GCC(sig1=None, sig2=None, fftlen=None)`

Returns a GCC instance.

Provides estimation methods for Generalized Cross Correlation.

Parameters

sig1

[ndarray] First signal.

sig2

[ndarray] Second signal.

fftlen

[int or None] Length of fft to be computed. If None, it will be calculated automatically as next power of two.

Returns

gcc

[GCC]

Examples

Attributes

spec11

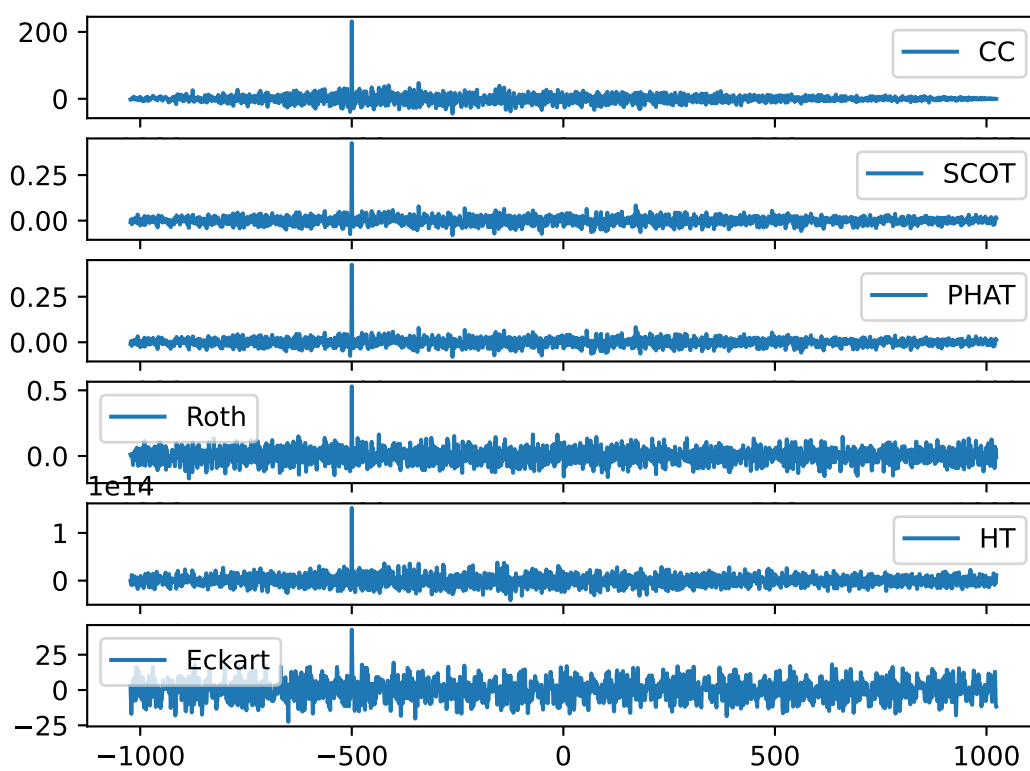
Returns auto power spectrum of first signal.

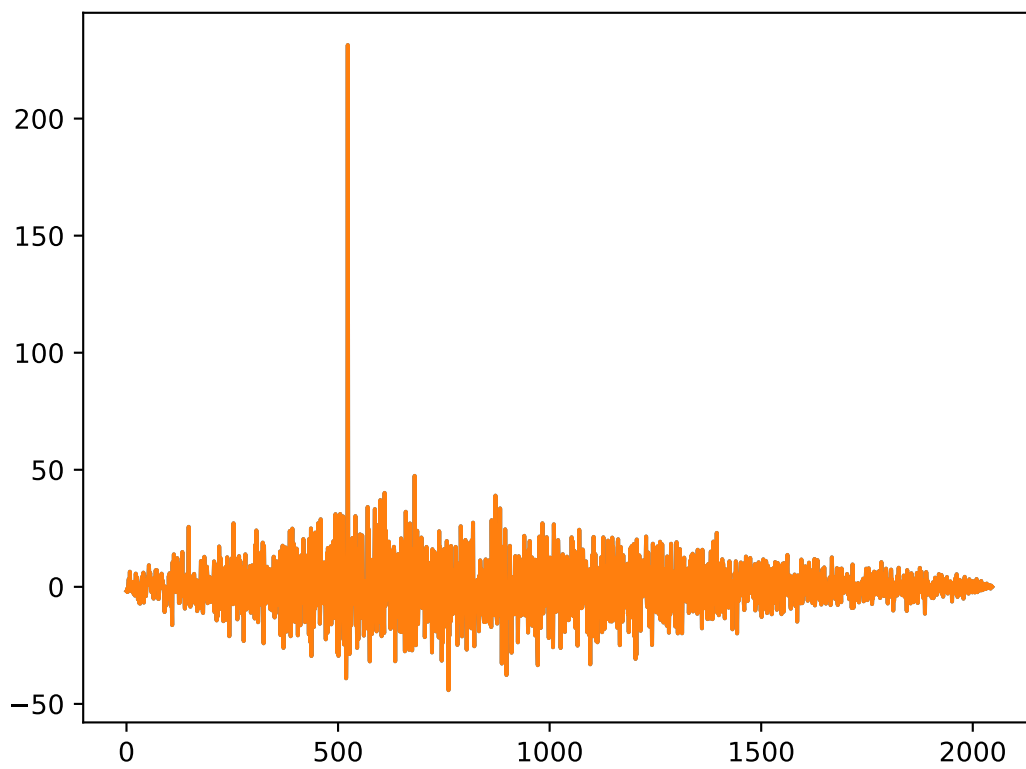
spec12

Returns cross power spectrum of first and second signal.

spec22

Returns auto power spectrum of second signal.





Methods

<i>Estimate</i> (name, sig, spec)	Data of an Estimate.
<i>cc</i> ()	Returns GCC estimate
<i>coherence</i> ()	Returns the coherence.
<i>eckart</i> (sig0, noise1, noise2)	Returns an eckart estimate.
<i>from_spectra</i> (spec1, spec2[, onesided])	Returns a GCC instance.
<i>gamma12</i> ()	Returns $\gamma_{12}(\omega)$
<i>ht</i> ()	Returns GCC HT estimate
<i>phat</i> ()	Returns GCC PHAT estimate
<i>roth</i> ()	Returns GCC Roth estimate
<i>scot</i> ()	Returns GCC SCOT estimate

classmethod *from_spectra*(spec1, spec2, onesided=True)

Returns a GCC instance.

Parameters

spec1

[ndarray] First spectrum.

spec2

[ndarray] Second spectrum.

onesided

[bool] If you provide twosided Spectra (e.g. of complex signals) set to False. Default is True.

Returns

gcc

[GCC]

property *spec11*

Returns auto power spectrum of first signal.

property *spec22*

Returns auto power spectrum of second signal.

property *spec12*

Returns cross power spectrum of first and second signal.

class *Estimate*(name: str, sig: ndarray, spec: ndarray)

Data of an Estimate. Instances are returned by estimators in GCC.

Parameters

name

[str] Name of the estimator.

sig

[ndarray] Estimator signal array (Rxy(t), Cross Correlation).

spec

[ndarray] Estimator spectrum (Rxy(f)).

Methods

index_to_lag	
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cc()

Returns GCC estimate

$\mathcal{F}^{-1}(S_{xy})$

roth()

Returns GCC Roth estimate

$\mathcal{F}^{-1}(S_{xy}/S_{xx})$

scot()

Returns GCC SCOT estimate

Smoothed gamma12 Transformed GCC.

$\mathcal{F}^{-1}(S_{xy}/\sqrt{S_{xx}S_{yy}})$

gamma12()

Returns gamma12 $\gamma_{12}(f)$

coherence()

Returns the coherence.

phat()

Returns GCC PHAT estimate

PHase Transformed GCC.

$\mathcal{F}^{-1}(S_{xy}/|S_{xy}|)$

eckart(sig0, noise1, noise2)

Returns an eckart estimate.

Parameters

sig0

[ndarray] estimate of the actual signal to be correlated.

noise1

[ndarray] estimated noise in sig1.

noise2

[ndarray] estimated noise in sig2

Returns

estimate

[GCC.Estimate]

ht()

Returns GCC HT estimate

gccestimating.corrlags(corrlen, samplerate=1)

Returns array of lags.

Parameters

corrlen

[int] Length of correlation function (usually $2N-1$).

samplerate

[scalar]

Returns

lags

[ndarray]

INDICES AND TABLES

- `genindex`
- `search`

PYTHON MODULE INDEX

g

`gccestimating`, [1](#)

C

`cc()` (*gccestimating.GCC method*), 5
`coherence()` (*gccestimating.GCC method*), 5
`corrlags()` (*in module gccestimating*), 5

E

`eckart()` (*gccestimating.GCC method*), 5

F

`from_spectra()` (*gccestimating.GCC class method*), 4

G

`gamma12()` (*gccestimating.GCC method*), 5
`GCC` (*class in gccestimating*), 1
`GCC.Estimate` (*class in gccestimating*), 4
`gccestimating`
 module, 1

H

`ht()` (*gccestimating.GCC method*), 5

M

`module`
 gccestimating, 1

P

`phat()` (*gccestimating.GCC method*), 5

R

`roth()` (*gccestimating.GCC method*), 5

S

`scot()` (*gccestimating.GCC method*), 5
`spec11` (*gccestimating.GCC property*), 4
`spec12` (*gccestimating.GCC property*), 4
`spec22` (*gccestimating.GCC property*), 4