

# Package: frequencyConnectedness (via r-universe)

September 3, 2024

**Type** Package

**Title** Spectral Decomposition of Connectedness Measures

**Version** 0.2.4

**Date** 2023-02-23

**Description** Accompanies a paper (Barunik, Krehlik (2018) [doi:10.1093/jjfinec/nby001](https://doi.org/10.1093/jjfinec/nby001)) dedicated to spectral decomposition of connectedness measures and their interpretation. We implement all the developed estimators as well as the historical counterparts. For more information, see the help or GitHub page (<https://github.com/tomaskrehlik/frequencyConnectedness>) for relevant information.

**Depends** vars, urca, knitr, pbapply

**Suggests** testthat, stringr, mAr, reshape2, ggplot2, parallel, zoo, BigVAR

**Imports** methods

**License** GPL-2

**RoxygenNote** 7.2.3

**BugReports** <https://github.com/tomaskrehlik/frequencyConnectedness/issues>

**URL** <https://github.com/tomaskrehlik/frequencyConnectedness>

**Repository** <https://tomaskrehlik.r-universe.dev>

**RemoteUrl** <https://github.com/tomaskrehlik/frequencyconnectedness>

**RemoteRef** HEAD

**RemoteSha** 51250a989b18088c1307c57ba589406add4be872

## Contents

collapseBounds . . . . .	3
--------------------------	---

collapseBounds.list_of_spills . . . . .	3
collapseBounds.spillover_table . . . . .	4
exampleSim . . . . .	5
fevd . . . . .	5
fftFEVD . . . . .	6
fftGenFEVD . . . . .	6
from . . . . .	7
from.list_of_spills . . . . .	8
from.spillover_table . . . . .	8
genFEVD . . . . .	9
getIndeces . . . . .	10
getPartition . . . . .	10
net . . . . .	11
net.list_of_spills . . . . .	11
net.spillover_table . . . . .	12
overall . . . . .	13
overall.list_of_spills . . . . .	13
overall.spillover_table . . . . .	14
pairwise . . . . .	15
pairwise.list_of_spills . . . . .	15
pairwise.spillover_table . . . . .	16
plotFrom . . . . .	17
plotFrom.list_of_spills . . . . .	17
plotNet . . . . .	18
plotNet.list_of_spills . . . . .	19
plotOverall . . . . .	19
plotOverall.list_of_spills . . . . .	20
plotPairwise . . . . .	21
plotPairwise.list_of_spills . . . . .	21
plotSpecific . . . . .	22
plotSpecific.list_of_spills . . . . .	23
plotTo . . . . .	23
plotTo.list_of_spills . . . . .	24
print.list_of_spills . . . . .	25
print.spillover_table . . . . .	25
spillover . . . . .	26
spilloverBK09 . . . . .	26
spilloverBK12 . . . . .	27
spilloverDY09 . . . . .	28
spilloverDY12 . . . . .	28
spilloverFft . . . . .	29
spilloverRolling . . . . .	30
spilloverRollingBK09 . . . . .	31
spilloverRollingBK12 . . . . .	32
spilloverRollingDY09 . . . . .	33
spilloverRollingDY12 . . . . .	34
to . . . . .	35
to.list_of_spills . . . . .	35

*collapseBounds* 3

to.spillover\_table . . . . . 36  
volatilities . . . . . 36

**Index** 37

---

*collapseBounds*      *Method for for collapsing bound for frequency spillovers*

---

**Description**

Method for for collapsing bound for frequency spillovers

**Usage**

```
collapseBounds(spillover_table, which)
```

**Arguments**

spillover\_table      the output of spillover estimation function or rolling spillover estimation function

which      integer vector indicating which of the frequency bounds we want to have collapsed

**Value**

New spillover object with collapsed bounds

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

*collapseBounds.list\_of\_spills*  
*Function to collapse bounds*

---

**Description**

Taking in *list\_of\_spills*, if the individual *spillover\_tables* are frequency based, it allows you to collapse several frequency bands into one.

**Usage**

```
## S3 method for class 'list_of_spills'  
collapseBounds(spillover_table, which)
```

**Arguments**

spillover\_table  
a list\_of\_spills object, ideally from the provided estimation functions

which  
which frequency bands to collapse. Should be a sequence like 1:2 or 1:5, etc.

**Value**

list\_of\_spills with less frequency bands.

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

collapseBounds.spillover\_table  
*Function to collapse bounds*

---

**Description**

Taking in spillover\_table, if the spillover\_table is frequency based, it allows you to collapse several frequency bands into one.

**Usage**

```
## S3 method for class 'spillover_table'  
collapseBounds(spillover_table, which)
```

**Arguments**

spillover\_table  
a spillover\_table object, ideally from the provided estimation functions

which  
which frequency bands to collapse. Should be a sequence like 1:2 or 1:5, etc.

**Value**

spillover\_table with less frequency bands.

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

`exampleSim`*The simulated time-series*

---

**Description**

The dataset includes three simulated processes with spillover dynamics.

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

`fevd`*Compute a forecast error vector decomposition in recursive identification scheme*

---

**Description**

This function computes the standard forecast error vector decomposition given the estimate of the VAR.

**Usage**

```
fevd(est, n.ahead = 100, no.corr = F)
```

**Arguments**

<code>est</code>	the VAR estimate from the vars package
<code>n.ahead</code>	how many periods ahead should be taken into account
<code>no.corr</code>	boolean if the off-diagonal elements should be set to 0.

**Value**

a matrix that corresponds to contribution of *i*th variable to *j*th variance of forecast

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

fftFEVD	<i>Compute a FFT transform of forecast error vector decomposition in recursive identification scheme</i>
---------	--

---

### Description

This function computes the decomposition of standard forecast error vector decomposition given the estimate of the VAR. The decomposition is done according to the Stiasny (1996)

### Usage

```
fftFEVD(est, n.ahead = 100, no.corr = F, range)
```

### Arguments

est	the VAR estimate from the vars package
n.ahead	how many periods ahead should be taken into account
no.corr	boolean if the off-diagonal elements should be set to 0.
range	defines the frequency partitions to which the spillover should be decomposed

### Value

a list of matrices that corresponds to contribution of ith variable to jth variance of forecast

### Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

---

fftGenFEVD	<i>Compute a FFT transform of forecast error vector decomposition in generalised VAR scheme.</i>
------------	--

---

### Description

This function computes the decomposition of standard forecast error vector decomposition given the estimate of the VAR. The decomposition is done according to the Stiasny (1996)

### Usage

```
fftGenFEVD(est, n.ahead = 100, no.corr = F, range)
```

**Arguments**

est	the VAR estimate from the vars package
n.ahead	how many periods ahead should be taken into account
no.corr	boolean if the off-diagonal elements should be set to 0.
range	defines the frequency partitions to which the spillover should be decomposed

**Value**

a list of matrices that corresponds to contribution of ith variable to jth variance of forecast

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

from *Method for computing FROM spillovers*

---

**Description**

Method for computing FROM spillovers

**Usage**

```
from(spillover_table, ...)
```

**Arguments**

spillover_table	the output of spillover estimation function or rolling spillover estimation function
...	other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

Value for FROM spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

from.list\_of\_spills    *Function to compute from spillovers*

---

### Description

Taking in list\_of\_spillovers, the function computes the from spillovers for all the individual spillover\_table.

### Usage

```
## S3 method for class 'list_of_spills'
from(spillover_table, within = F, ...)
```

### Arguments

spillover\_table  
                   a list\_of\_spills object, ideally from rolling window estimation

within            whether to compute the within spillovers if the spillover tables are frequency based.

...               for the sake of CRAN not to complain

### Value

a list containing the from spillovers

### Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

---

from.spillover\_table    *Function to compute from spillovers*

---

### Description

Taking in spillover\_table, the function computes the from spillover.

### Usage

```
## S3 method for class 'spillover_table'
from(spillover_table, within = F, ...)
```

### Arguments

spillover\_table  
                   a spillover\_table object, ideally from the provided estimation functions

within            whether to compute the within spillovers if the spillover tables are frequency based.

...               for the sake of CRAN not to complain



**Value**

a list containing the from spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

genFEVD	<i>Compute a forecast error vector decomposition in generalised VAR scheme.</i>
---------	---

---

**Description**

This function computes the standard forecast error vector decomposition given the estimate of the VAR. There are common complaints and requests whether the computation is ok and why it does not follow the original Pesaran Shin (1998) article. So let me clear two things out. First, the  $\sigma$  in the equation on page 20 refers to elements of  $\Sigma$ , not standard deviation. Second, the indexing is wrong, it should be  $\sigma_{jj}$  not  $\sigma_{ii}$ . Look, for example, to Diebold and Yilmaz (2012) or ECB WP by Dees, Holly, Pesaran, and Smith (2007) for the correct version.

**Usage**

```
genFEVD(est, n.ahead = 100, no.corr = F)
```

**Arguments**

est	the VAR estimate from the vars package
n.ahead	how many periods ahead should be taken into account
no.corr	boolean if the off-diagonal elements should be set to 0.

**Value**

a matrix that corresponds to contribution of ith variable to jth variance of forecast

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

getIndeces                      *Get the indeces for the individual intervals*

---

**Description**

This function returns the indeces of the vector coming from DFT of time series of length n.ahead that correspond to frequencies in the interval (up, down].

**Usage**

```
getIndeces(n.ahead, up, down)
```

**Arguments**

n.ahead	the length of the vector coming out of the DFT
up	the upper boundary of the interval
down	the lower boundary of the interval

**Author(s)**

Tomas Krehlik <tomas.krehlik@sorgmail.com>

---

getPartition                      *Get a list of indeces corresponding to parts of frequency partition*

---

**Description**

This function takes in a vector of numbers denoting the breaks in partition of an interval and returns a list of indeces that correspond to indeces that are contained within an individual intervals. The individual parts then contain (a,b] for all pairs in the interval. Hence if you want pi to be included, the partition should start with something slightly bigger than pi.

**Usage**

```
getPartition(partition, n.ahead)
```

**Arguments**

partition	breaking points of partition of frequency interval, should be ordered decreasingly.
n.ahead	how many observations is the FFT done on.

**Value**

a list of vectors of indeces corresponding to individual partitions

**Author(s)**

Tomas Krehlik <tomas.krehlik@sorgmail.com>

---

net *Method for computing NET spillovers*

---

**Description**

Method for computing NET spillovers

**Usage**

```
net(spillover_table, ...)
```

**Arguments**

spillover_table	the output of spillover estimation function or rolling spillover estimation function
...	other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

Value for NET spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

net.list\_of\_spills *Function to compute net spillovers*

---

**Description**

Taking in list\_of\_spillovers, the function computes the net spillovers for all the individual spillover\_table.

**Usage**

```
## S3 method for class 'list_of_spills'
net(spillover_table, within = F, ...)
```

**Arguments**

spillover\_table  
a list\_of\_spills object, ideally from rolling window estimation

within  
whether to compute the within spillovers if the spillover tables are frequency based.

...  
for the sake of CRAN not to complain

**Value**

a list containing the net spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

net.spillover\_table    *Function to compute net spillovers*

---

**Description**

Taking in spillover\_table, the function computes the net spillover.

**Usage**

```
## S3 method for class 'spillover_table'  
net(spillover_table, within = F, ...)
```

**Arguments**

spillover\_table  
a spillover\_table object, ideally from the provided estimation functions

within  
whether to compute the within spillovers if the spillover tables are frequency based.

...  
for the sake of CRAN not to complain

**Value**

a list containing the net spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

overall	<i>Method for computing overall spillovers</i>
---------	--

---

**Description**

Method for computing overall spillovers

**Usage**

```
overall(spillover_table, ...)
```

**Arguments**

spillover_table	the output of spillover estimation function or rolling spillover estimation function
...	other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

Value for overall spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

overall.list_of_spills	<i>Function to compute overall spillovers</i>
------------------------	---

---

**Description**

Taking in list\_of\_spillovers, the function computes the overall spillovers for all the individual spillover\_table.

**Usage**

```
## S3 method for class 'list_of_spills'  
overall(spillover_table, within = F, ...)
```

**Arguments**

spillover\_table  
a list\_of\_spills object, ideally from rolling window estimation

within  
whether to compute the within spillovers if the spillover tables are frequency based.

...  
for the sake of CRAN not to complain

**Value**

a list containing the overall spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

overall.spillover\_table

*Function to compute overall spillovers*

---

**Description**

Taking in spillover\_table, the function computes the overall spillover.

**Usage**

```
## S3 method for class 'spillover_table'  
overall(spillover_table, within = F, ...)
```

**Arguments**

spillover\_table  
a spillover\_table object, ideally from the provided estimation functions

within  
whether to compute the within spillovers if the spillover tables are frequency based.

...  
for the sake of CRAN not to complain

**Value**

a list containing the overall spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

pairwise *Method for computing PAIRWISE spillovers*

---

**Description**

Method for computing PAIRWISE spillovers

**Usage**

```
pairwise(spillover_table, ...)
```

**Arguments**

spillover\_table      the output of spillover estimation function or rolling spillover estimation function

...                    other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

Value for PAIRWISE spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

pairwise.list\_of\_spills  
*Function to compute pairwise spillovers*

---

**Description**

Taking in list\_of\_spillovers, the function computes the pairwise spillovers for all the individual spillover\_table.

**Usage**

```
## S3 method for class 'list_of_spills'  
pairwise(spillover_table, within = F, ...)
```

**Arguments**

spillover\_table  
a list\_of\_spills object, ideally from rolling window estimation

within  
whether to compute the within spillovers if the spillover tables are frequency based.

...  
for the sake of CRAN not to complain

**Value**

a list containing the pairwise spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

pairwise.spillover\_table

*Function to compute pairwise spillovers*

---

**Description**

Taking in spillover\_table, the function computes the pairwise spillover.

**Usage**

```
## S3 method for class 'spillover_table'  
pairwise(spillover_table, within = F, ...)
```

**Arguments**

spillover\_table  
a spillover\_table object, ideally from the provided estimation functions

within  
whether to compute the within spillovers if the spillover tables are frequency based.

...  
for the sake of CRAN not to complain

**Value**

a list containing the pairwise spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>



---

plotFrom                      *Method for plotting FROM spillovers*

---

**Description**

Method for plotting FROM spillovers

**Usage**

```
plotFrom(spillover_table, ...)
```

**Arguments**

spillover\_table                      the output of rolling spillover estimation function

...                                      other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

The plot

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

plotFrom.list\_of\_spills  
*Function to plot from spillovers*

---

**Description**

Taking in list\_of\_spillovers, the function plots the from spillovers using the zoo::plot.zoo function

**Usage**

```
## S3 method for class 'list_of_spills'
plotFrom(
  spillover_table,
  within = F,
  which = 1:nrow(spillover_table$list_of_tables[[1]]$tables[[1]]),
  ...
)
```

**Arguments**

spillover\_table a list\_of\_spills object, ideally from rolling window estimation  
 within whether to compute the within spillovers if the spillover tables are frequency based.  
 which a vector with indices specifying which plots to plot.  
 ... for the sake of CRAN not to complain

**Value**

a plot of from spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

 plotNet

*Method for plotting NET spillovers*

---

**Description**

Method for plotting NET spillovers

**Usage**

```
plotNet(spillover_table, ...)
```

**Arguments**

spillover\_table the output of rolling spillover estimation function  
 ... other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

The plot

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

plotNet.list\_of\_spills  
*Function to plot net spillovers*

---

**Description**

Taking in list\_of\_spillovers, the function plots the net spillovers using the zoo::plot.zoo function

**Usage**

```
## S3 method for class 'list_of_spills'  
plotNet(  
  spillover_table,  
  within = F,  
  which = 1:nrow(spillover_table$list_of_tables[[1]]$tables[[1]]),  
  ...  
)
```

**Arguments**

spillover\_table  
a list\_of\_spills object, ideally from rolling window estimation

within  
whether to compute the within spillovers if the spillover tables are frequency based.

which  
a vector with indices specifying which plots to plot.

...  
for the sake of CRAN not to complain

**Value**

a plot of net spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

plotOverall *Method for plotting overall spillovers*

---

**Description**

Method for plotting overall spillovers

**Usage**

```
plotOverall(spillover_table, ...)
```

**Arguments**

`spillover_table`  
the output of rolling spillover estimation function

... other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

The plot

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

`plotOverall.list_of_spills`

*Function to plot overall spillovers*

---

**Description**

Taking in `list_of_spillovers`, the function plots the overall spillovers using the `zoo::plot.zoo` function

**Usage**

```
## S3 method for class 'list_of_spills'  
plotOverall(spillover_table, within = F, ...)
```

**Arguments**

`spillover_table`  
a `list_of_spills` object, ideally from rolling window estimation

`within`  
whether to compute the within spillovers if the spillover tables are frequency based.

... for the sake of CRAN not to complain

**Value**

a plot of overall spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

plotPairwise                    *Method for plotting PAIRWISE spillovers*

---

**Description**

Method for plotting PAIRWISE spillovers

**Usage**

```
plotPairwise(spillover_table, ...)
```

**Arguments**

spillover\_table                the output of rolling spillover estimation function

...                              other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

The plot

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

plotPairwise.list\_of\_spills  
                                   *Function to plot pairwise spillovers*

---

**Description**

Taking in list\_of\_spillovers, the function plots the pairwise spillovers using the zoo::plot.zoo function

**Usage**

```
## S3 method for class 'list_of_spills'
plotPairwise(
  spillover_table,
  within = F,
  which = 1:ncol(utils::combn(nrow(spillover_table$list_of_tables[[1]]$tables[[1]]), 2)),
  ...
)
```

**Arguments**

spillover\_table      a list\_of\_spills object, ideally from rolling window estimation

within                whether to compute the within spillovers if the spillover tables are frequency based.

which                 a vector with indices specifying which plots to plot.

...                    for the sake of CRAN not to complain

**Value**

a plot of pairwise spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

plotSpecific            *Method for plotting specific pair spillover*

---

**Description**

Method for plotting specific pair spillover

**Usage**

```
plotSpecific(spillover_table, ...)
```

**Arguments**

spillover\_table      the output of rolling spillover estimation function

...                    other arguments like which specific pair to plot.

**Value**

The plot

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

`plotSpecific.list_of_spills`*Function to plot specific spillover from i to j*

---

**Description**

Taking in `list_of_spillovers`, the function plots the spillover from `i` to `j` using the `zoo::plot.zoo` function

**Usage**

```
## S3 method for class 'list_of_spills'  
plotSpecific(spillover_table, i, j, ...)
```

**Arguments**

<code>spillover_table</code>	a <code>list_of_spills</code> object, ideally from rolling window estimation
<code>i</code>	from variable
<code>j</code>	to variable
<code>...</code>	for the sake of CRAN not to complain

**Value**

a plot of pairwise spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

`plotTo`*Method for plotting TO spillovers*

---

**Description**

Method for plotting TO spillovers

**Usage**

```
plotTo(spillover_table, ...)
```

**Arguments**

<code>spillover_table</code>	the output of rolling spillover estimation function
<code>...</code>	other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

The plot

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

plotTo.list\_of\_spills *Function to plot to spillovers*

---

**Description**

Taking in list\_of\_spillovers, the function plots the to spillovers using the zoo::plot.zoo function

**Usage**

```
## S3 method for class 'list_of_spills'  
plotTo(  
  spillover_table,  
  within = F,  
  which = 1:nrow(spillover_table$list_of_tables[[1]]$tables[[1]]),  
  ...  
)
```

**Arguments**

spillover_table	a list_of_spills object, ideally from rolling window estimation
within	whether to compute the within spillovers if the spillover tables are frequency based.
which	a vector with indices specifying which plots to plot.
...	for the sake of CRAN not to complain

**Value**

a plot of to spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>



---

print.list\_of\_spills *Function to not print the list\_of\_spills object*

---

**Description**

Usually it is not a good idea to print the list\_of\_spills object, hence this function implements warning and shows how to print them individually if the user really wants to.

**Usage**

```
## S3 method for class 'list_of_spills'  
print(x, ...)
```

**Arguments**

x                    a list\_of\_spills object, ideally from the provided estimation functions  
...                    for the sake of CRAN not to complain

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

print.spillover\_table *Function to print the spillover table object*

---

**Description**

The function takes as an argument the spillover\_table object and prints it nicely to the console. While doing that it also computes all the necessary measures.

**Usage**

```
## S3 method for class 'spillover_table'  
print(x, ...)
```

**Arguments**

x                    a spillover\_table object, ideally from the provided estimation functions  
...                    for the sake of CRAN not to complain

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

 spillover

*Computing spillover from a fevd*


---

**Description**

This function is an internal implementation of the spillover. The spillover is in general defined as the contribution of the other variables to the fevd of the self variable. This function computes the spillover as the contribution of the diagonal elements of the fevd to the total sum of the matrix. The other functions are just wrappers around this function. In general, other spillovers could be implemented using this function.

**Usage**

```
spillover(func, est, n.ahead, no.corr = F)
```

**Arguments**

func	name of the function that returns FEVD for the estimate est
est	the estimate of a system, typically VAR estimate in our case
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero

**Value**

spillover\_table object

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

 spilloverBK09

*Computing the decomposed spillover from a fevd as defined by Barunik, Krehlik (2018)*


---

**Description**

This function is an internal implementation of the frequency spillover. We apply the identification scheme suggested by fevd to the frequency decomposition of the transfer functions from the estimate est.

**Usage**

```
spilloverBK09(est, n.ahead = 100, no.corr, partition)
```

**Arguments**

est	the estimate of a system, typically VAR estimate in our case
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero
partition	defines the frequency partitions to which the spillover should be decomposed

**Value**

spillover\_table object

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

spilloverBK12

*Computing the decomposed spillover from a generalized fevd as defined by Barunik, Krehlik (2018)*

---

**Description**

This function is an internal implementation of the frequency spillover. We apply the identification scheme suggested by fevd to the frequency decomposition of the transfer functions from the estimate est.

**Usage**

```
spilloverBK12(est, n.ahead = 100, no.corr, partition)
```

**Arguments**

est	the estimate of a system, typically VAR estimate in our case
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero
partition	defines the frequency partitions to which the spillover should be decomposed

**Value**

spillover\_table object

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

spilloverDY09	<i>Computing spillover from a fevd according to Diebold Yilmaz (2009)</i>
---------------	---

---

**Description**

This function is an internal implementation of the spillover. The spillover is in general defined as the contribution of the other variables to the fevd of the self variable. This function computes the spillover as the contribution of the diagonal elements of the fevd to the total sum of the matrix. The other functions are just wrappers around this function. In general, other spillovers could be implemented using this function.

**Usage**

```
spilloverDY09(est, n.ahead = 100, no.corr)
```

**Arguments**

est	the estimate of a system, typically VAR estimate in our case
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero

**Value**

spillover\_table object

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

spilloverDY12	<i>Computing spillover from a generalized fevd according to Diebold Yilmaz (2012)</i>
---------------	---

---

**Description**

This function is an internal implementation of the spillover. The spillover is in general defined as the contribution of the other variables to the fevd of the self variable. This function computes the spillover as the contribution of the diagonal elements of the fevd to the total sum of the matrix. The other functions are just wrappers around this function. In general, other spillovers could be implemented using this function.

**Usage**

```
spilloverDY12(est, n.ahead = 100, no.corr)
```

**Arguments**

est	the estimate of a system, typically VAR estimate in our case
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero

**Value**

spillover\_table object

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

 spilloverFft

---

*Computing the decomposed spillover from a fevd*


---

**Description**

This function is an internal implementation of the frequency spillover. We apply the identification scheme suggested by fevd to the frequency decomposition of the transfer functions from the estimate est.

**Usage**

```
spilloverFft(func, est, n.ahead, partition, no.corr = F)
```

**Arguments**

func	name of the function that returns FEVD for the estimate est
est	the estimate of a system, typically VAR estimate in our case
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
partition	defines the frequency partitions to which the spillover should be decomposed
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero

**Value**

spillover\_table object

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

 spilloverRolling      *Computing rolling spillover*


---

### Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover. For usage, see how spilloverRollingDY09, etc. are implemented.

### Usage

```
spilloverRolling(
  func_spill,
  params_spill,
  func_est,
  params_est,
  data,
  window,
  cluster = NULL,
  check_data = TRUE
)
```

### Arguments

func_spill	name of the function that returns FEVD for the estimate est
params_spill	parameters from spillover estimation function as a list
func_est	name of the estimation function
params_est	parameters from the estimation function as a list
data	variable containing the dataset
window	length of the window to be rolled
cluster	either NULL for no parallel processing or the variable containing the cluster.
check_data	whether to check the data for NAs before starting estimation. Typically should be left true unless the underlying estimate is providing a way how to infer those NAs.

### Value

A corresponding spillover value on a given frequency band, ordering of bands corresponds to the ordering of original bounds.

### Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

---

spilloverRollingBK09 *Computing rolling frequency spillover from a fevd as defined by Barunik, Krehlik (2018)*

---

### Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover.

### Usage

```
spilloverRollingBK09(
  data,
  n.ahead = 100,
  no.corr,
  partition,
  func_est,
  params_est,
  window,
  cluster = NULL
)
```

### Arguments

data	variable containing the dataset
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero
partition	how to split up the estimated spillovers into frequency bands. Should be a vector of bound points that starts with 0 and ends with $\pi+0.00001$ .
func_est	estimation function, usually would be VAR or BigVAR function to estimate the multivariate system
params_est	parameters passed to the estimation function, as a list, for parameters refer to documentation of the estimating function
window	length of the window to be rolled
cluster	either NULL for no parallel processing or the variable containing the cluster.

### Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

---

spilloverRollingBK12 *Computing rolling frequency spillover from a generalized fevd as defined by Barunik, Krehlik (2018)*

---

### Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover.

### Usage

```
spilloverRollingBK12(
  data,
  n.ahead = 100,
  no.corr,
  partition,
  func_est,
  params_est,
  window,
  cluster = NULL
)
```

### Arguments

data	variable containing the dataset
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero
partition	defines the frequency partitions to which the spillover should be decomposed
func_est	a name of the function to estimate with, for example "var" for VAR from vars package
params_est	a list of the parameters to pass to the function besides the data that are passed as a first element.
window	length of the window to be rolled
cluster	either NULL for no parallel processing or the variable containing the cluster.

### Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>



---

spilloverRollingDY09 *Computing rolling spillover according to Diebold Yilmaz (2009)*

---

### Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover.

### Usage

```
spilloverRollingDY09(  
  data,  
  n.ahead = 100,  
  no.corr,  
  func_est,  
  params_est,  
  window,  
  cluster = NULL  
)
```

### Arguments

data	variable containing the dataset
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero
func_est	estimation function, usually would be VAR or BigVAR function to estimate the multivariate system
params_est	parameters passed to the estimation function, as a list, for parameters refer to documentation of the estimating function
window	length of the window to be rolled
cluster	either NULL for no parallel processing or the variable containing the cluster.

### Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

---

spilloverRollingDY12 *Computing rolling spillover from the generalized fevd according to Diebold Yilmaz (2012)*

---

### Description

This function computes the rolling spillover using the standard VAR estimate. We implement the parallel version for faster processing. The window is of fixed window and is rolled over the data. Interpretation of the other parameters is the same as in the standard computation of spillover.

### Usage

```
spilloverRollingDY12(  
  data,  
  n.ahead = 100,  
  no.corr,  
  func_est,  
  params_est,  
  window,  
  cluster = NULL  
)
```

### Arguments

data	variable containing the dataset
n.ahead	how many periods ahead should the FEVD be computed, generally this number should be high enough so that it won't change with additional period
no.corr	boolean parameter whether the off-diagonal in the covariance matrix should be set to zero
func_est	estimation function, usually would be VAR or BigVAR function to estimate the multivariate system
params_est	parameters passed to the estimation function, as a list, for parameters refer to documentation of the estimating function
window	length of the window to be rolled
cluster	either NULL for no parallel processing or the variable containing the cluster.

### Author(s)

Tomas Krehlik <tomas.krehlik@gmail.com>

---

to *Method for computing TO spillovers*

---

**Description**

Method for computing TO spillovers

**Usage**

```
to(spillover_table, ...)
```

**Arguments**

spillover\_table the output of spillover estimation function or rolling spillover estimation function

... other arguments like whether it is within or absolute spillover in case of the frequency spillovers

**Value**

Value for TO spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

to.list\_of\_spills *Function to compute to spillovers*

---

**Description**

Taking in list\_of\_spillovers, the function computes the to spillovers for all the individual spillover\_table.

**Usage**

```
## S3 method for class 'list_of_spills'
to(spillover_table, within = F, ...)
```

**Arguments**

spillover\_table a list\_of\_spills object, ideally from rolling window estimation

within whether to compute the within spillovers if the spillover tables are frequency based.

... for the sake of CRAN not to complain

**Value**

a list containing the to spillovers

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

to.spillover\_table      *Function to compute to spillovers*

---

**Description**

Taking in spillover\_table, the function computes the to spillover.

**Usage**

```
## S3 method for class 'spillover_table'
to(spillover_table, within = F, ...)
```

**Arguments**

spillover_table	a spillover_table object, ideally from the provided estimation functions
within	whether to compute the within spillovers if the spillover tables are frequency based.
...	for the sake of CRAN not to complain

**Value**

a list containing the to spillover

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

---

volatilities      *Volatilities from Ox Man Institute*

---

**Description**

The dataset includes median realised volatilities of some financial indices

**Author(s)**

Tomas Krehlik <tomas.krehlik@gmail.com>

# Index

## \* data

- exampleSim, 5
- volatilities, 36

collapseBounds, 3

collapseBounds.list\_of\_spills, 3

collapseBounds.spillover\_table, 4

exampleSim, 5

fevd, 5

fftFEVD, 6

fftGenFEVD, 6

from, 7

from.list\_of\_spills, 8

from.spillover\_table, 8

genFEVD, 9

getIndeces, 10

getPartition, 10

net, 11

net.list\_of\_spills, 11

net.spillover\_table, 12

overall, 13

overall.list\_of\_spills, 13

overall.spillover\_table, 14

pairwise, 15

pairwise.list\_of\_spills, 15

pairwise.spillover\_table, 16

plotFrom, 17

plotFrom.list\_of\_spills, 17

plotNet, 18

plotNet.list\_of\_spills, 19

plotOverall, 19

plotOverall.list\_of\_spills, 20

plotPairwise, 21

plotPairwise.list\_of\_spills, 21

plotSpecific, 22

plotSpecific.list\_of\_spills, 23

plotTo, 23

plotTo.list\_of\_spills, 24

print.list\_of\_spills, 25

print.spillover\_table, 25

spillover, 26

spilloverBK09, 26

spilloverBK12, 27

spilloverDY09, 28

spilloverDY12, 28

spilloverFft, 29

spilloverRolling, 30

spilloverRollingBK09, 31

spilloverRollingBK12, 32

spilloverRollingDY09, 33

spilloverRollingDY12, 34

to, 35

to.list\_of\_spills, 35

to.spillover\_table, 36

volatilities, 36