

# Types of attributes and methods of the SpectralAnalyzer class

Notation:

- $I$  denotes the number of items.
- $C$  denotes the number of separate categories associated with the items.
- $N$  denotes the number of nodes.
- $P$  denotes the number of patterns.
- $Y$  denotes the number of years for which observations exist.

## Attributes

**observations:** list

CODE	vector(character)	YEAR	numeric	...	...
CODE	vector(character)	YEAR	numeric	...	...
...	...	...	...	...	...
CODE	vector(character)	YEAR	numeric	...	...

**items:** vector(character)

**items\_categories:** data.frame

	category 1	category 2	...	category C
item 1	factor	factor	...	factor
item 2	factor	factor	...	factor
...	...	...	...	...
item I	factor	factor	...	factor

**target:** character

**count:** numeric

**min\_length:** numeric

**max\_length:** numeric

**status\_limit:** numeric

**nodes\_per\_year:** matrix

	year 1	year 2	...	year Y
node 1	numeric	numeric	...	numeric
node 2	numeric	numeric	...	numeric
...	...	...	...	...
node N	numeric	numeric	...	numeric

**nodes:** data.frame

node	length	weigh
vector(character)	numeric	numeric

**n\_links:** matrix

	node 1	node 2	...	node N
node 1	numeric	numeric	...	numeric
node 2	numeric	numeric	...	numeric
...	...	...	...	...
node N	numeric	numeric	...	numeric

**nodes\_links:** data.frame

Source	Target	ID	items	weight
numeric	numeric	numeric	character	numeric

**obs\_patterns:** matrix

	pattern 1	pattern 2	...	pattern P
node 1	logical	logical	...	logical
node 2	logical	logical	...	logical
...	...	...	...	...
node N	logical	logical	...	logical

**patterns\_per\_year:** matrix

	year 1	year 2	...	year Y
pattern 1	numeric	numeric	...	numeric
pattern 2	numeric	numeric	...	numeric
...	...	...	...	...
pattern P	numeric	numeric	...	numeric

**patterns:** data.frame

pattern	year	frequency	weight	order	specificity	status
vector(character)	numeric	numeric	numeric	numeric	numeric	character

**p\_links:** matrix

	pattern 1	pattern 2	...	pattern P
pattern 1	numeric	numeric	...	numeric
pattern 2	numeric	numeric	...	numeric
...	...	...	...	...
pattern P	numeric	numeric	...	numeric

**patterns\_links:** data.frame

Source	Target	ID	items	weight	year
numeric	numeric	numeric	character	numeric	numeric

# Methods

**spectral.analyzer**(**observations**: see attribute **observations**, **items**: see data.frame below,  
**target**: character, **count**: numeric, **min\_length**: numeric, **max\_length**: numeric,  
**status\_limit**: numeric)

item	category 1	category 2	...	category C
character	factor	factor	...	factor

**list\_obs\_per\_year()**: see attribute **nodes\_per\_year**

**list\_separate\_obs()**: see attribute **nodes**

**count\_links(entities: character)**: see attributes **n\_links** and **p\_links**

**search\_links(entities: character)**: see attributes **nodes\_links** and **patterns\_links**

**list\_separate\_patterns(target: character, count: numeric, min\_length: numeric,  
max\_length: numeric)**: data.frame

pattern	weight
vector(character)	numeric

**list\_patterns\_by\_obs()**: see attribute **obs\_patterns**

**list\_patterns\_per\_year()**: see attribute **patterns\_per\_year**

**compute\_patterns\_characteristics()**: see attribute **patterns**

**compute\_specificity(patterns: list(vector(numeric)), frequencies: vector(numeric),  
weights: vector(numeric))**: vector(numeric)

**compute\_ksi\_threshold(reporting\_indexes: vector(numeric))**: numeric

**compute\_ri\_threshold(reporting\_indexes: vector(numeric), ksi: numeric)**: numeric

**compute\_reporting\_indexes(patterns: list(vector(numeric)), t: numeric, period: numeric)**:  
data.frame

pattern	ri
vector(character)	numeric

**check\_params\_for\_RI(t: numeric, period: numeric)**: list

t	numeric
period	numeric

**compute\_reporting\_indexes\_limits(patterns: list(vector(numeric)), first\_limit: numeric, t: numeric,  
period: numeric)**: data.frame

pattern	ri_2	ri_period
vector(character)	numeric	numeric

**define\_dynamic\_status**(patterns: list(vector(numeric)), status\_limit: numeric, t: numeric, period: numeric): data.frame

pattern	Status
vector(character)	character

**spectrum\_chart**(patterns\_characteristics: see attribute **patterns**, path: character, name: character, title: character): data.frame

ID	pattern	frequency	weight	order	specificity	status
numeric	vector(character)	numeric	numeric	numeric	numeric	character

**create\_spectrum\_chart**(patterns\_characteristics: see attribute **patterns**, weights\_by\_node\_type: see data.frame below, title: character)

complex_nodes	simple_node
numeric	numeric

**compute\_pattern\_distribution\_in\_nodes**(patterns: list(vector(numeric))): list

[[ "weight\_distribution" ]]:

1	vector(numeric)
2	vector(numeric)
...	...
P	vector(numeric)

[[ "length\_distribution" ]]:

1	vector(numeric)
2	vector(numeric)
...	...
P	vector(numeric)

**spectrosome\_chart**(entities : character, characteristics: see attribute **nodes** or **patterns**, nb\_graph: numeric, min\_link\_weight: numeric, vertex\_size: character, path: character, name: character, title: character, ...): list

[[ "vertices" ]]:

ID	node	length	weight	degree
numeric	vector(character)	numeric	numeric	numeric

or

ID	pattern	frequency	weight	order	specificity	status	degree
numeric	vector(character)	numeric	numeric	numeric	numeric	character	numeric

[[ "edges" ]]: see attribute **nodes\_links** or **patterns\_links**

[[ "coords" ]]: list of matrices

	x	y
vertex 1	numeric	numeric
vertex 2	numeric	numeric
...	...	...
vertex P	numeric	numeric

**cluster\_text**(**graph**: see matrix below, **links**: see attribute **patterns\_links**)

	x	y
vertex 1	numeric	numeric
vertex 2	numeric	numeric
...	...	...
vertex P	numeric	numeric

**cluster\_chart**(**entities**: character, **characteristics**: see attribute **nodes** or **patterns**, **item**: numeric, **vertex\_size**: character, **path**: character, **name**: character, **title**: character, ...): list

[["vertices"]]:

ID	node	length	weight	degree
numeric	vector(character)	numeric	numeric	numeric

or

ID	pattern	frequency	weight	order	specificity	status	degree
numeric	vector(character)	numeric	numeric	numeric	numeric	character	numeric

[["edges"]]: see attribute **nodes\_links** or **patterns\_links**

[["coords"]]: matrix

	x	y
vertex 1	numeric	numeric
vertex 2	numeric	numeric
...	...	...
vertex P	numeric	numeric

**network\_density**(**links**: see attribute **nodes\_links** or **patterns\_links**): numeric

**degree**(**ID**: numeric, **links**: see attribute **nodes\_links** or **patterns\_links**): numeric

**tree\_chart**(**patterns\_characteristics**: see attribute **patterns**, **display\_text**: character, **cutoff**: numeric, **path**: character, **name**: character, **title**: character): data.frame

ID	pattern	frequency	weight	order	specificity	status
numeric	vector(character)	numeric	numeric	numeric	numeric	character

**create\_tree\_chart**(**patterns\_characteristics**: see attribute **patterns**,

**items\_category**: see data.frame below, **category**: character, **cutoff**: numeric, **display\_text**: character, **title**: character)

item	category
character	character

**save\_characteristics**(**entities**: character, **characteristics**: see attribute **nodes** or **patterns**, ...)

**extract\_nodes\_from\_items**(**nodes\_characteristics**: see attribute **nodes**, **items**: vector(numeric), **target**: character): see attribute **nodes**

**extract\_nodes\_from\_characteristic**(**nodes\_characteristics**: see attribute **nodes**,  
**characteristic**: character, **value**: numeric,  
**condition**: character): see attribute **nodes**

**extract\_nodes\_from\_category**(**nodes\_characteristics**: see attribute **nodes**,  
**category**: character | numeric, **value**: character,  
**target**: character): see attribute **nodes**

**check\_access\_for\_category**(**category**: character | numeric, **value**: character)

**extract\_patterns\_from\_items**(**patterns\_characteristics**: see attribute **patterns**,  
**items**: vector(numeric), **target**: character): see attribute **patterns**

**extract\_patterns\_from\_characteristic**(**patterns\_characteristics**: see attribute **patterns**,  
**characteristic**: character, **value**: numeric,  
**condition**: character): see attribute **patterns**

**extract\_patterns\_from\_status**(**patterns\_characteristics**: see attribute **patterns**,  
**value**: vector(character), **condition**: character): see attribute **patterns**

**extract\_patterns\_from\_category**(**patterns\_characteristics**: see attribute **patterns**,  
**category**: character | numeric, **value**: character,  
**target**: character): see attribute **patterns**

**extract\_links**(**entities** : character, **characteristics**: see attribute **nodes** or **patterns**): see attribute  
**nodes\_links** or **patterns\_links**