

# 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.
- $V_c$  denotes the number of separate values in the category  $c$ .
- $N$  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:** named 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

**categories\_colors:** list(named vector(character))

\$category1

value 1	character
value 2	character
...	...
value $V_1$	character

\$category2

value 1	character
value 2	character
...	...
value $V_2$	character

...

\$categoryC

value 1	character
value 2	character
...	...
value $V_C$	character

**target:** character

**count:** numeric

**min\_length:** numeric

**max\_length:** numeric

**status\_limit:** numeric

**nodes:** data.frame

node	length	weight
vector(character)	numeric	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

**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

endpoint.1	endpoint.2	items	weight
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:** data.frame

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

**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

**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

endpoint.1	endpoint.2	items	weight	year
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): SpectralAnalyzer

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

**reset**(**object**: SpectralAnalyzer, **from**: numeric)

**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, identifiers: character, path: character, name: character, title: character): data.frame

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

**plot\_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"]]: [["length\_distribution"]]:

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

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

**spectrosome\_chart**(entities: character, characteristics: see attribute nodes or patterns, identifiers: character, nb\_graphs: numeric, min\_link\_weight: numeric, vertex\_size: character, vertex\_col: character, clusters: numeric, highlight: numeric, use\_names: logical, n.cutoff: numeric, c.cutoff: numeric, display\_mixt: logical, path: character, name: character, title: character, ...): list

[["vertices"]]:

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

or (depends on the value of **entities**)

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

[["edges"]]:

ID	endpoint.1	endpoint.2	items	weight
numeric	numeric	numeric	character	numeric

or (depends on the value of **entities**)

ID	endpoint.1	endpoint.2	items	weight	year
numeric	numeric	numeric	character	numeric	numeric

[["coords"]]: list(matrix)

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

**cluster\_text**(**graph**: see matrix below, **links**: see attributes **nodes\_links** and **patterns\_links**,  
**display**: numeric, **highlight**: numeric, **use\_names**: logical, **cutoff**: numeric)

	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,  
**identifiers**: character, **use\_name**: logical, **n.cutoff**: numeric, **vertex\_size**: character,  
**vertex\_col**: character, **c.cutoff**: numeric, **display\_mixt**: logical, **path**: character,  
**name**: character, **title**: character, ...): list

[["vertices"]]:

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

or (depends on the value of **entities**)

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

[["edges"]]:

ID	endpoint.1	endpoint.2	items	weight
numeric	numeric	numeric	character	numeric

or (depends on the value of **entities**)

ID	endpoint.1	endpoint.2	items	weight	year
numeric	numeric	numeric	character	numeric	numeric

[["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**, identifiers: character, use\_names: logical, n.cutoff: numeric, display\_status: logical, display\_text: character, c.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

**plot\_tree\_chart**(patterns\_characteristics: see attribute **patterns**, items\_category: see data.frame below, category: character, c.cutoff: numeric, use\_names: logical, n.cutoff: numeric, display\_status: logical, 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**

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

**get\_isolates**(**entities**: character, **characteristics**: see attribute **nodes** or **patterns**): see attribute  
**nodes** or **patterns**

**get\_non\_isolates**(**entities**: character, **characteristics**: see attribute **nodes** or **patterns**): see attribute  
**nodes** or **patterns**

**get\_complexes**(**entities**: character, **characteristics**: see attribute **nodes** or **patterns**,  
**category**: character | numeric, **target**: character, **min\_nb\_values**: numeric): see  
attribute **nodes** or **patterns**