

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.
- $+$ denotes public attributes and methods (i.e. exported attributes and methods).
- $-$ denotes private attributes and methods (i.e. attributes and methods not exported).

Class attributes

- **STATUS_PERSISTENT**: character
- **STATUS_DECLINING**: character
- **STATUS_EMERGENT**: character
- **STATUS_LATENT**: character
- **NODES**: character
- **PATTERNS**: character
- **RULES**: character
- **NODES_OR_PATTERNS**: character
- **NODES_PATTERNS_OR_RULES**: character
- **NODES_LINKS**: character
- **PATTERNS_LINKS**: character

Attributes

+ **observations**: list

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

+ **items**: named vector(character) or named vector(numeric)

+ **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

+ **status_colors**: vector(character)

+ **parameters**: list(**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, **init**: logical, **verbose**: logical): SpectralAnalyzer

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

+ **reset**(**object**: SpectralAnalyzer, **from**: numeric, **verbose**: logical)

+ **init**(**part**: character, **verbose**: logical): itemsets (class object from arules package) or NULL

– **init_nodes**(**verbose**: logical)

– **init_nodes_links**(**verbose**: logical)

- **init_patterns(verbose: logical)**: itemsets (class object from arules package) or NULL
- **init_patterns_links(verbose: logical)**

- + **is_init(part: character)**: logical or vector(logical)
- **is_init_nodes()**: logical
- **is_init_nodes_links()**: logical
- **is_init_patterns()**: logical
- **is_init_patterns_links()**: logical
- **check_init(part: character or vector(character), stop: logical, prefix: character, suffix: character)**: logical or vector(logical)

- **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, arules: logical)**: itemsets (class object from arules package) or 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(character)), 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(character)), 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(character)), **first_limit**: numeric, **t**: numeric, **period**: numeric): data.frame

pattern	ri_2	ri_period
vector(character)	numeric	numeric

– **define_dynamic_status**(patterns: list(vector(character)), **status_limit**: numeric, **t**: numeric, **period**: numeric): data.frame

pattern	Status
vector(character)	character

+ **spectrum_chart**(pc: character or see attribute **patterns**, **identifiers**: character, **sort**: logical, **title**: character, **path**: character, **name**: character): data.frame

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

– **plot_spectrum_chart**(pc: see attribute **patterns**, **weights**: see method **weight_by_node_complexity**, **title**: character)

– **pattern_node_characteristics**(patterns: list(vector(character))): list

[["weights"]]:

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

[["lengths"]]:

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

+ **weight_by_node_complexity**(patterns: list(vector(character))): matrix

complex	simple
numeric	numeric

+ **spectrosome_chart**(nopc: character or see attribute **nodes** or **patterns**, **identifiers**: character, **nb_graphs**: numeric, **min_link_weight**: numeric, **vertex_size**: character or numeric or vector(numeric), **size_range**: vector(numeric), **vertex_col**: character or vector(character), **clusters**: numeric, **highlight**: numeric, **use_names**: logical, **n.cutoff**: numeric, **c.cutoff**: numeric, **display_mixt**: logical, **title**: character, **path**: character, **name**: character, ...): list

[["vertices"]]: data.frame

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

or (depends on the type of entities contained in **nopc**)

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

[["edges"]]: data.frame

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

or (depends on the type of entities contained in **nopc**)

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**(**nopc**: character or see attribute **nodes** or **patterns**, **item**: numeric,
identifiers: character, **use_name**: logical, **n.cutoff**: numeric,
vertex_size: character or numeric or vector(numeric),
size_range: vector(numeric), **vertex_col**: character or vector(character),
c.cutoff: numeric, **display_mixed**: logical, **title**: character, **path**: character,
name: character, ...): list

[["vertices"]]: data.frame

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

or (depends on the type of entities contained in **nopc**)

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

[["edges"]]: data.frame

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

or (depends on the type of entities contained in **nopc**)

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

- + **pattern_chart**(pc: character or see attribute **patterns**, identifiers: character, length_one: logical, jitter: logical, display_status: logical, display_text: character, use_names: logical, n.cutoff: numeric, category: character or numeric, c.cutoff: numeric, sort_by: character, title: character, path: character, name: character): data.frame

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

- **plot_pattern_chart**(pc: see attribute **patterns**, items_category: see data.frame below, category: character, c.cutoff: numeric, use_names: logical, n.cutoff: numeric, jitter: logical, display_status: logical, display_text: character, title: character)

item	category
character	character

- + **category_tree_chart**(category: character or numeric, items: see attribute **items**, use_names: logical, n.cutoff: numeric, c.cutoff: numeric, vertex_size: numeric, vertex_alpha: numeric, leaf_size: numeric, leaf_alpha: numeric, leaf_margin: numeric, label_size: numeric, label_margin: numeric): ggplot2 graph
- + **co_occurrence_chart**(items: see attribute **items**, category: character or numeric, min_occ: numeric, max_occ: numeric, use_names: logical, n.cutoff: numeric, c.cutoff: numeric, sort_by: character, vertex_size: numeric, vertex_alpha: numeric, vertex_margin: numeric, label_size: numeric, label_margin: numeric, edge_tension: numeric, edge_alpha: numeric, palette: character or numeric, palette_direction: numeric): ggplot2 graph

+ **extract_rules**(**from**: character or list, **pruning**: logical, **arules**: logical, **as_sets**: logical, ...): rules (class object from arules package) or data.frame

antecedent		consequent	support	confidence	lift	count
vector(character)	=>	character	numeric	numeric	numeric	numeric

or (**antecedent** and **consequent** types depend on the value of **as_sets**. Presence of **count** or **itemset** depends on the value of **from**)

antecedent		consequent	support	confidence	lift	itemset
factor	=>	factor	numeric	numeric	numeric	numeric

+ **rules_chart**(**rules**: see method **extract_rules**, **items**: see attribute **items**, **parameters**: list, **display**: character, **threshold**: numeric, **use_names**: logical, **n.cutoff**: numeric, **category**: character or numeric, **c.cutoff**: numeric, **sort_by**: character, **vertex_size**: numeric, **vertex_alpha**: numeric, **vertex_margin**: numeric, **label_size**: numeric, **label_margin**: numeric, **edge_tension**: numeric, **edge_alpha**: numeric, **palette**: character, **palette_direction**: numeric): list

[["graph"]]: ggplot2 graph

[["rules"]]: see method **extract_rules**

+ **save_characteristics**(**characteristics**: character or see attribute **nodes** or **patterns** or return of function **extract_rules**, ...)

+ **get_nodes**(**nc**: character or see attribute **nodes**, **element**: character or numeric, **value**: numeric or vector(numeric) or character or vector(character), **condition**: character): see attribute **nodes**

– **get_nodes_from_items**(**nc**: character or see attribute **nodes**, **items**: vector(numeric), **condition**: character): see attribute **nodes**

– **get_nodes_from_characteristic**(**nc**: character or see attribute **nodes**, **characteristic**: character, **value**: numeric, **condition**: character): see attribute **nodes**

– **get_nodes_from_category**(**nc**: character or see attribute **nodes**, **category**: character or numeric, **value**: character, **condition**: character): see attribute **nodes**

+ **get_patterns**(**pc**: character or see attribute **patterns**, **element**: character or numeric, **value**: numeric or vector(numeric) or character or vector(character), **condition**: character): see attribute **patterns**

– **get_patterns_from_items**(**pc**: character or see attribute **patterns**, **items**: vector(numeric), **condition**: character): see attribute **patterns**

– **get_patterns_from_characteristic**(**pc**: character or see attribute **patterns**, **characteristic**: character, **value**: numeric, **condition**: character): see attribute **patterns**

- **get_patterns_from_status**(**pc**: character or see attribute **patterns**, **value**: vector(character),
condition: character): see attribute **patterns**
- **get_patterns_from_category**(**pc**: character or see attribute **patterns**,
category: character or numeric, **value**: character,
condition: character): see attribute **patterns**
- + **get_links**(**nopc**: character or see attribute **nodes** or **patterns**): see attribute **nodes_links** or **patterns_links**
- + **get_isolates**(**nopc**: character or see attribute **nodes** or **patterns**): see attribute **nodes** or **patterns**
- + **get_non_isolates**(**nopc**: character or see attribute **nodes** or **patterns**): see attribute **nodes** or **patterns**
- + **get_complexes**(**nopc**: character or see attribute **nodes** or **patterns**,
category: character or numeric, **condition**: character, **min_nb_values**: numeric):
see attribute **nodes** or **patterns**
- **check_access_for_category**(**category**: character or numeric, **value**: character, **stop**: logical): logical
- **get_nopc**(**nopc**: character or see attribute **nodes** or **patterns**, **entities**: character): see attribute **nodes** or **patterns**
- **get_nop**(**nop**: character or list(vector(character)), **entities**: character): list(vector(character))
- **which_entities**(**npr**: see attribute **nodes** or **patterns** or return of function **extract_rules**,
entities: character): character
- **which_associated_links**(**name**: character): character
- **which_name**(**name**: character or vector(character)): character or vector(character)