

# Package ‘smvgraph’

May 9, 2026

**Type** Package

**Title** Various Multivariate Graphics with Variable Choice in Shiny Apps

**Version** 0.1.2

**Date** 2021-11-08

**Description**

Mosaic diagram, scatterplot matrix, Andrews curves, parallel coordinate diagram, radar diagram, and Chernoff plots as a Shiny app, which allow the order of variables to be changed interactively. The apps are intended as teaching examples.

**License** GPL-3

**Encoding** UTF-8

**Imports** MASS, fmsb, DescTools, shiny, shinydashboard, sortable

**RoxygenNote** 7.1.1

**NeedsCompilation** no

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**Repository** CRAN

**Date/Publication** 2021-11-09 08:10:02 UTC

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andrews

*andrews***Description**

Andrews curves for visualization of multidimensional data. `step` determines the number of line segments for each curve. If `ymax==NA` then the maximum y coordinate will be determined from the curves. Note that for `type==3` the x range is  $[0, 4 * \pi]$  otherwise  $[-\pi, \pi]$ .

**Usage**

```
andrews(x, type = 1, step = 100, ..., normalize = 1, ymax = NA)
```

**Arguments**

<code>x</code>	data frame or matrix
<code>type</code>	type of curve (default: 1) <ul style="list-style-type: none"> <li>1: <math>f(t) = x1/(2^0.5) + x2 * \sin(t) + x3 * \cos(t) + x4 * \sin(2 * t) + x5 * \cos(2 * t) + \dots</math></li> <li>2: <math>f(t) = x1 * \sin(t) + x2 * \cos(t) + x3 * \sin(2 * t) + x4 * \cos(2 * t) + \dots</math></li> <li>3: <math>f(t) = x1 * \cos(t) + x2 * \cos((2 * t)^0.5) + x3 * \cos((3 * t)^0.5) + \dots</math></li> <li>4: <math>f(t) = 1/(2^0.5) * (x1 + x2 * (\sin(t) + \cos(t)) + x3 * (\sin(t) - \cos(t)) + x4 * (\sin(2 * t) + \cos(2 * t)) + x5 * (\sin(2 * t) - \cos(2 * t)) + \dots)</math></li> </ul>
<code>step</code>	smoothness of curves
<code>...</code>	further parameters given to <code>graphics::plot</code> and <code>graphics::lines()</code>
<code>normalize</code>	integer: normalization method (default: 1) <ul style="list-style-type: none"> <li>0: no rescaling</li> <li>1: <math>(x - \min(x)) / (\max(x) - \min(x))</math></li> <li>2: <math>(x - \text{mean}(x)) / \text{sd}(x)</math></li> </ul>
<code>ymax</code>	numeric: maximum of y coordinate (default: NA)

**Value**

nothing

**References**

- Andrews, D. F. (1972) Plots of High-Dimensional Data. *Biometrics*, vol. 28, no. 1, pp. 125-136.
- Khattree, R., Naik, D. N. (2002) Andrews Plots for Multivariate Data: Some New Suggestions and Applications. *Journal of Statistical Planning and Inference*, vol. 100, no. 2, pp. 411-425.

**See Also**

In package [andrews](#) or at [CRAN](#)

**Examples**

```
andrews(iris[,-5], col=as.factor(iris[,5]))
andrews(iris[,-5], type=4, col=as.factor(iris[,5]), ymax=2)
```

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normalize

*normalize*

---

**Description**

Extracts the numeric vectors from a data frame and normalizes each vector.

**Usage**

```
normalize(x, method = 1)
```

**Arguments**

x	data.frame or matrix
method	integer: normalization method (default: 1) <ul style="list-style-type: none"><li>• 0: no rescaling</li><li>• 1: <math>(x - \min(x)) / (\max(x) - \min(x))</math></li><li>• 2: <math>(x - \text{mean}(x)) / \text{sd}(x)</math></li></ul>

**Value**

numeric matrix

**See Also**

In package [normalize](#) or at [CRAN](#)

**Examples**

```
normalize(iris, 2)
```

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order_andrews	<i>order_andrews</i>
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### Description

Returns a reordering of the columns of  $x$  to visualize outliers or clusters better. If no column names are given then  $V1, V2, \dots$  will be used.

### Usage

```
order_andrews(x, method = 1)
```

### Arguments

$x$	data matrix
method	numeric: order method (default: 1) <ul style="list-style-type: none"> <li>• 1: interquartile range</li> <li>• 2: <math>\max(x - \text{median}(x))/IQR(x)</math> (outlier)</li> <li>• 3: fit to a Ward cluster solution with euclidean distance</li> </ul>

### Value

order of column vectors

### Examples

```
order_andrews(iris)
```

---

order_parcoord	<i>order_parcoord</i>
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### Description

Returns a reordering of the columns of  $x$  to visualize highly correlated variable pairs based on a cluster analysis of the correlation matrix. If no column names are given then  $V1, V2, \dots$  will be used.

### Usage

```
order_parcoord(x, method = "spearman", ...)
```

### Arguments

$x$	data matrix
method	numeric: order method (default: "spearman")
$\dots$	further parameters given to <code>stats::cor()</code>

**Value**

order of column vectors

**Examples**

```
order_parcoord(iris)
```

---

sandrews

*sandrews*

---

**Description**

Shiny app for creating an Andrews curve diagram with interactive variable selection.

**Usage**

```
sandrews(data, xvar = character(0), ...)
```

**Arguments**

data	matrix or data.frame
xvar	character: names of selected variables for the plot
...	further parameters given to <a href="#">andrews()</a>

**Value**

nothing

**Examples**

```
if (interactive()) sandrews(iris)
```

---

schernoff

*schernoff*

---

**Description**

Shiny app for creating a Chernoff faces plot with interactive variable selection.

**Usage**

```
schernoff(data, xvar = character(0), ...)
```

**Arguments**

data	matrix or data.frame
xvar	character: names of selected variables for the plot
...	further parameters given to <a href="#">DescTools::PlotFaces()</a>

**Value**

nothing

**Examples**

```
if (interactive()) schernoff(normalize(iris))
```

---

smosaic

*smosaic*

---

**Description**

Shiny app for creating a Mosaic plot with interactive variable selection.

**Usage**

```
smosaic(data, xvar = character(0), yvar = character(0), ...)
```

**Arguments**

data	table or data.frame
xvar	character: names of selected variables for x-axis
yvar	character: names of selected variables for y-axis
...	further parameters given to <a href="#">graphics::mosaicplot()</a>

**Value**

nothing

**Examples**

```
if (interactive()) smosaic(Titanic)
dfTitanic <- table2dataframe(Titanic)
if (interactive()) smosaic(dfTitanic)
```

---

spairs	<i>spairs</i>
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**Description**

Shiny app for creating a scatterplot matrix with interactive variable selection.

**Usage**

```
spairs(data, xvar = character(0), ...)
```

**Arguments**

data	matrix or data.frame
xvar	character: names of selected variables for the plot
...	further parameters given to <a href="#">graphics::pairs()</a>

**Value**

nothing

**Examples**

```
if (interactive()) spairs(iris, col=as.factor(iris$Species))
```

---

sparcoord	<i>sandrews</i>
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**Description**

Shiny app for creating a Parallel Coordinate plot with interactive variable selection.

**Usage**

```
sparcoord(data, xvar = character(0), ...)
```

**Arguments**

data	matrix or data.frame
xvar	character: names of selected variables for the plot
...	further parameters given to <a href="#">MASS::parcoord()</a>

**Value**

nothing

**Examples**

```
if (interactive()) sparcoord(iris, col=as.factor(iris$Species))
```

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sradar	<i>sradar</i>
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**Description**

Shiny app for creating radar charts with interactive variable selection.

**Usage**

```
sradar(data, xvar = character(0), ...)
```

**Arguments**

data	matrix or data.frame
xvar	character: names of selected variables for the plot
...	further parameters given to <code>fmsb::radarchart()</code>

**Value**

nothing

**Examples**

```
if (interactive()) sradar(normalize(iris))
```

---

table2dataframe	<i>table2dataframe</i>
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**Description**

Converts a table to a full data frame.

**Usage**

```
table2dataframe(tab, ...)
```

**Arguments**

tab	table: contingency table
...	further parameters given to <code>base::as.data.frame.table()</code>

*table2dataframe*

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**Value**

a data frame with `sum(tab)` rows and `length(dim(tab))` cols

**Examples**

```
table2dataframe(Titanic)
```

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