Package 'mandelbrot'

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Type Package

Title Generates Views on the Mandelbrot Set

Version 0.2.0

Description Estimates membership for the Mandelbrot set.

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Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

Imports reshape2

Suggests testthat, RColorBrewer

NeedsCompilation yes

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Repository CRAN

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Contents

as.data.frame.mandelbrot *Convert Mandelbrot object to data.frame for plotting*

Description

Converts objects produced by `mandelbrot` to tidy data.frames for use with ggplot and other tidyverse packages.

Usage

```
## S3 method for class 'mandelbrot'
as.data.frame(x, ...)
```

Arguments

`x`	a Mandelbrot set object produced by `mandelbrot`
`...`	ignored

Value

a 3-column `data.frame`

Examples

```
mb <- mandelbrot()
df <- as.data.frame(mb)
head(df)
```

mandelbrot *Calculate the Mandelbrot set*

Description

Generates a view on the Mandelbrot set using an underlying C function.

Usage

```
mandelbrot(xlim = c(-2, 2), ylim = c(-2, 2), resolution = 600,
  iterations = 50)

mandelbrot0(xlim = c(-2, 2), ylim = c(-2, 2), resolution = 600,
  iterations = 50)
```

Arguments

`xlim`	limits of x axis (real part)
`ylim`	limits of y axis (imaginary part)
`resolution`	either an integer n for n^2 pixels or a list with x and y components specifying the resolution in each direction (e.g. `list(x = 500, y = 500)`)
`iterations`	maximum number of iterations to evaluate each case

Details

`mandelbrot0` is an experimental interface for generating tidy data.frames faster than `as.data.frame(mandelbrot())`.

Value

a `mandelbrot` structure with components: `x` a vector of the real parts of the x-axis; `y` the imaginary parts of each number (the y-axis); `z` a matrix of the number of iterations that $|z| < 2$

Mandelbrot set

In brief, the Mandelbrot set contains the complex numbers where the 0 orbit of the following function remains bounded (< 2):

$$f_{z+1} = z^2 + c$$

For information and discussion on the Mandelbrot and related sets, one great resource is plus.maths.org. There's also a popular YouTube video by Numberphile.

Credits

Wraps original C code by Mario dos Reis, September 2003.

References

https://stat.ethz.ch/pipermail/r-help/2003-October/039773.html http://people.cryst.bbk.ac.uk/~fdosr01/Rfractals/index.html

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`mandelbrot_palette` *Generate palette suitable for coloring a set*

Description

Takes a simple palette and expands / oscillates it for use with Mandelbrot sets.

Usage

```
mandelbrot_palette(palette, fold = TRUE, reps = 1L, in_set = "black")
```

Arguments

palette	vector of color hex strings (e.g. '#FFFFFF')
fold	wrap or fold the palette back on itself
reps	number of times to replicate the color vector
in_set	color for areas in the Mandelbrot set

Value

an extended color vector

Examples

```
view <- mandelbrot(xlim = c(-0.8438146, -0.8226294),
  ylim = c(0.1963144, 0.2174996), iter = 500)

# can be used to simply interpolate a color gradient
spectral <- RColorBrewer::brewer.pal(11, "Spectral")
cols <- mandelbrot_palette(spectral, fold = FALSE)
plot(view, col = cols, transform = "inv")

# simple palettes might need folds / reps to look good
blues <- RColorBrewer::brewer.pal(9, "Blues")
cols <- mandelbrot_palette(blues, in_set = "white",
  fold = TRUE, reps = 2)
plot(view, col = cols, transform = "log")
```

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plot.mandelbrot *Plot a Mandelbrot set using base graphics*

Description

Draws colored set membership using image.

Usage

```
## S3 method for class 'mandelbrot'
plot(x, col = mandelbrot_palette(c("white",
  grey.colors(50))), transform = c("none", "inverse", "log"), asp = 1, ...)
```

Arguments

x	an object generated by mandelbrot
col	a vector of colors, such as those generated by mandelbrot_palette
transform	the name of a transformation to apply to the number of iterations matrix
asp	the asp parameter to image which controls aspect ratio
...	extra arguments passed to image

Index