

Package: mandelbrot (via r-universe)

November 6, 2024

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

Config/pak/sysreqs libicu-dev

Repository <https://blmoore.r-universe.dev>

RemoteUrl <https://github.com/blmoore/mandelbrot>

RemoteRef HEAD

RemoteSha fdb7b75294317f2111b45b9bea05c04251750c64

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```
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

<code>x</code>	a Mandelbrot set object produced by <code>mandelbrot</code>
<code>...</code>	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. <code>list(x = 500, y = 500)</code>)
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>

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")
```

plot.mandelbrot	<i>Plot a Mandelbrot set using base graphics</i>
-----------------	--

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

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