

Package ‘colorplane’

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Type Package

Title Basic S4 Classes and Methods for Mapping Between Numeric Values and Colors

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Description A simple set of classes and methods for mapping between scalar intensity values and colors. There is also support for layering maps on top of one another using alpha composition.

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Contents

alpha_channel	2
as_hexcol	3
as_rgb	3
blend_colors	4
col2hex	5
ColorPlane-class	6
ColorScale-class	6
ConstantColorPlane-class	6
DiscreteColorPlane-class	7
get_color	8
HexColorPlane-class	8

IntensityColorPlane-class	9
map_colors	9
rgb2hex	10
RGBColorPlane-class	11
Index	12

alpha_channel	<i>alpha_channel</i>
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Description

extract the alpha channel

Usage

```
alpha_channel(x, ...)

## S4 method for signature 'HexColorPlane'
alpha_channel(x, normalize = TRUE)

## S4 method for signature 'ConstantColorPlane'
alpha_channel(x, normalize = TRUE)

## S4 method for signature 'RGBColorPlane'
alpha_channel(x, normalize = TRUE)
```

Arguments

- x the object to extract alpha channel from
- ... extra args
- normalize divide by 255

Value

a numeric vector of alpha channel values

Examples

```
cp <- IntensityColorPlane(seq(1,5), cols=rainbow(25))
cl <- map_colors(cp, irange=c(0,50))
stopifnot(length(alpha_channel(cl)) == 5)
```

as_hexcol	<i>convert to hex colors</i>
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Description

convert to hex colors

Usage

```
as_hexcol(x, ...)
```

```
## S4 method for signature 'RGBColorPlane'  
as_hexcol(x)
```

```
## S4 method for signature 'HexColorPlane'  
as_hexcol(x)
```

Arguments

x	the object to convert
...	extra args

Value

a character vector of ex colors

See Also

[rgb](#)

as_rgb	<i>convert to rgb colors</i>
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Description

convert to rgb colors

Usage

```
as_rgb(x, ...)
```

```
## S4 method for signature 'RGBColorPlane'  
as_rgb(x)
```

```
## S4 method for signature 'HexColorPlane'  
as_rgb(x)
```

```
## S4 method for signature 'ConstantColorPlane'
as_rgb(x)
```

Arguments

```
x                the object to convert
...              extra args
```

Value

a numeric matrix of rgb components

Examples

```
cp <- IntensityColorPlane(seq(1,100), cols=rainbow(25))
cl <- map_colors(cp, irange=c(0,50))
rgbcpls <- as_rgb(cl)
```

blend_colors	<i>blend two color planes</i>
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Description

given two color planes, generate a new color plane by blending the colors using the supplied alpha multiplier.

Usage

```
blend_colors(bottom, top, alpha)

## S4 method for signature 'ColorPlane,ColorPlane,numeric'
blend_colors(bottom, top, alpha = 1)

## S4 method for signature 'ColorPlane,ColorPlane,missing'
blend_colors(bottom, top)

## S4 method for signature 'HexColorPlane,RGBColorPlane,numeric'
blend_colors(bottom, top, alpha)

## S4 method for signature 'HexColorPlane,ConstantColorPlane,numeric'
blend_colors(bottom, top, alpha = 1)
```

Arguments

```
bottom           the bottom color plane
top              the top color plane
alpha            the alpha overlay value.
```

Details

The functions in this package blend colors based on the "over" operator where 'top' is foreground and 'bottom' is background.

Value

a new `ColorPlane` instance with 'top' and 'bottom' alpha-blended.

References

https://en.wikipedia.org/wiki/Alpha_compositing

Examples

```
top <- IntensityColorPlane(1:5, cols=rainbow(5))
bottom <- IntensityColorPlane(1:5, cols=rev(rainbow(5)))

top <- map_colors(top)
bottom <- map_colors(bottom)
bc <- blend_colors(bottom, top, .5)
```

col2hex	<i>convert color name to hex character string</i>
---------	---

Description

convert color name to hex character string

Usage

```
col2hex(cname, alpha = 1)
```

Arguments

cname	one or more color names, e.g. "red"
alpha	the value of the alpha channel, ranging from 0 to 1 (default is 1)

Value

a vector of hex color values, one per color name

ColorPlane-class	<i>ColorPlane</i>
------------------	-------------------

Description

ColorPlane

Slots

clr a field of colors

ColorScale-class	<i>ColorScale</i>
------------------	-------------------

Description

ColorScale

Slots

irange the intensity range of the scale
threshold the alpha thresholding range
clr a vector of hex colors

ConstantColorPlane-class	<i>ConstantColorPlane</i>
--------------------------	---------------------------

Description

ConstantColorPlane constructor taking a single hex ‘character’ vector defining a constant color plane.

Usage

ConstantColorPlane(clr)

Arguments

clr a single hex color as a ‘character’ vector of length 1 defining the constant color.

Value

a new [ConstantColorPlane](#) instance

Slots

clr the constant color as hex value

Examples

```
cp <- ConstantColorPlane(clr="#FF0000")
```

DiscreteColorPlane-class

DiscreteColorPlane

Description

DiscreteColorPlane constructor taking list with names mapping to color values in hex representation. This object is used when one has a one to one mapping between discrete set of strings/values to discrete set of colors.

Usage

```
DiscreteColorPlane(lookup)
```

Arguments

lookup a "lookup table", which is a named list mapping discrete values to hex colors

Value

a new [DiscreteColorPlane](#) instance

Slots

lookup a lookup table mapping values to hex colors

Examples

```
lookup <- as.list(col2hex(c("red", "blue", "green")))
names(lookup) <- c("a", "b", "c")
cp <- DiscreteColorPlane(lookup)

values <- c("a", "b", "c", "a", "c")
```

get_color	<i>get_color</i>
-----------	------------------

Description

get the color associated with one or more values

Usage

```
get_color(x, v, ...)
```

Arguments

x	the color lookup table
v	the intensity value(s)
...	extra args

Value

a color value

HexColorPlane-class	<i>HexColorPlane</i>
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Description

HexColorPlane constructor taking a 'character' vector of colors to define a color plane.

Usage

```
HexColorPlane(clr)
```

Arguments

clr	a vector of hex colors
-----	------------------------

Value

a new [HexColorPlane](#) instance

IntensityColorPlane-class
<i>IntensityColorPlane</i>

Description

An association of intensities and colors
IntensityColorPlane constructor

Usage

IntensityColorPlane(intensity, cols = rainbow(255), alpha = 1)

Arguments

intensity	a numeric vector of intensity values
cols	a vector of hex character codes
alpha	a vector of alpha values ranging from 0 to 1

Value

a new [IntensityColorPlane](#) instance

Slots

intensity a vector of intensity values
alpha a vector of alpha values
colmap a color map containing a vector of hex character codes

map_colors	<i>map data values to a set of colors</i>
------------	---

Description

instantiate a vector of colors from a ColorPlane specification.

Usage

```
map_colors(x, ...)

## S4 method for signature 'ConstantColorPlane'
map_colors(x)

## S4 method for signature 'HexColorPlane'
map_colors(x)

## S4 method for signature 'DiscreteColorPlane'
map_colors(x, values, ...)

## S4 method for signature 'IntensityColorPlane'
map_colors(x, alpha = 1, threshold = NULL, irange = NULL)
```

Arguments

x	the object to map over
...	extra args
values	the values to map to colors via the discrete lookup table
alpha	alpha multiplier from 0 to 1.
threshold	two-sided threshold as a 2-element vector, e.g. 'threshold=c(-3,3)' indicating two-sided transparency thresholds.
irange	the intensity range defining min and max of scale.

Value

a HexColorPlane instance containing the mapped colors

Examples

```
cp <- IntensityColorPlane(seq(1,100), cols=rainbow(25))
cl <- map_colors(cp, irange=c(0,50))
stopifnot(cl@clr[50] == rainbow(25)[25])
```

rgb2hex	<i>convert rgb colors to hex colors</i>
---------	---

Description

convert rgb colors to hex colors

Usage

```
rgb2hex(r, g, b, alpha)
```

Arguments

r	the red color component
g	the green color component
b	the blue color component
alpha	the alpha component

Value

a hex color representation as 'character' vector

RGBColorPlane-class	<i>RGBColorPlane</i>
---------------------	----------------------

Description

RGBColorPlane constructor taking a 3- or 4-column numeric matrix of RGB(A) colors in the 0-255 range.

Usage

```
RGBColorPlane(clr)
```

Arguments

clr	a matrix of colors where the first column is red, second column is green, third column is blue, and optional fourth column is alpha.
-----	--

Value

a new [RGBColorPlane](#) instance

Examples

```
rgba_cmat <- rbind(c(255,0,0,255),
                  c(0, 255, 0, 255),
                  c(0, 0, 255, 0))

cp <- RGBColorPlane(rgba_cmat)
stopifnot(all(cp@clr[1,] == c(255,0,0,255)))
```

Index

alpha_channel, [2](#)
alpha_channel, ConstantColorPlane-method
 (alpha_channel), [2](#)
alpha_channel, HexColorPlane-method
 (alpha_channel), [2](#)
alpha_channel, RGBColorPlane-method
 (alpha_channel), [2](#)
as_hexcol, [3](#)
as_hexcol, HexColorPlane-method
 (as_hexcol), [3](#)
as_hexcol, RGBColorPlane-method
 (as_hexcol), [3](#)
as_rgb, [3](#)
as_rgb, ConstantColorPlane-method
 (as_rgb), [3](#)
as_rgb, HexColorPlane-method (as_rgb), [3](#)
as_rgb, RGBColorPlane-method (as_rgb), [3](#)

blend_colors, [4](#)
blend_colors, ColorPlane, ColorPlane, missing-method
 (blend_colors), [4](#)
blend_colors, ColorPlane, ColorPlane, numeric-method
 (blend_colors), [4](#)
blend_colors, HexColorPlane, ConstantColorPlane, numeric-method
 (blend_colors), [4](#)
blend_colors, HexColorPlane, RGBColorPlane, numeric-method
 (blend_colors), [4](#)

col2hex, [5](#)
ColorPlane, [5](#)
ColorPlane-class, [6](#)
ColorScale-class, [6](#)
ConstantColorPlane, [6](#)
ConstantColorPlane
 (ConstantColorPlane-class), [6](#)
ConstantColorPlane-class, [6](#)

DiscreteColorPlane, [7](#)
DiscreteColorPlane
 (DiscreteColorPlane-class), [7](#)

DiscreteColorPlane-class, [7](#)

get_color, [8](#)

HexColorPlane, [8](#)
HexColorPlane (HexColorPlane-class), [8](#)
HexColorPlane-class, [8](#)

IntensityColorPlane, [9](#)
IntensityColorPlane
 (IntensityColorPlane-class), [9](#)
IntensityColorPlane-class, [9](#)

map_colors, [9](#)
map_colors, ConstantColorPlane-method
 (map_colors), [9](#)
map_colors, DiscreteColorPlane-method
 (map_colors), [9](#)
map_colors, HexColorPlane-method
 (map_colors), [9](#)
map_colors, IntensityColorPlane-method
 (map_colors), [9](#)

rgb, [3](#)
rgb2hex, [10](#)
RGBColorPlane, [11](#)
RGBColorPlane (RGBColorPlane-class), [11](#)
RGBColorPlane-class, [11](#)