

Package ‘munsell’

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Type Package

Title Utilities for Using Munsell Colours

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Description Provides easy access to, and manipulation of, the Munsell colours. Provides a mapping between Munsell's original notation (e.g. ``5R 5/10'') and hexadecimal strings suitable for use directly in R graphics. Also provides utilities to explore slices through the Munsell colour tree, to transform Munsell colours and display colour palettes.

Suggests ggplot2, testthat

Imports colorspace, methods

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chroma_slice	<i>Plot all colours with the same chroma</i>
--------------	--

Description

Plots slices of the Munsell colour system where chroma is constant.

Usage

```
chroma_slice(chroma.name = seq(0, 26, by = 2), back.col = "white")
```

Arguments

chroma.name	integer vector of the desired values.
back.col	colour for the background

Value

ggplot object

Examples

```
chroma_slice(2)
chroma_slice(18)
# Maybe want to delete text and add axis instead
p <- chroma_slice(18)
p$layers[[2]] <- NULL # remove text layer
p + ggplot2::theme(axis.text = ggplot2::element_text(),
  axis.text.x = ggplot2::element_text(angle = 90, hjust = 1))
# all values
## Not run: chroma_slice(seq(0, 38, by = 2))
```

complement	<i>Find the complement of a munsell colour</i>
------------	--

Description

Finds the munsell colour with the same chroma and value but on the opposite side of the hue circle. The complement is not defined for greys (hue == "N"), and the function returns the grey untransformed.

Usage

```
complement(col, ...)
```

Arguments

col	character vector of Munsell colours
...	passed on to in_gamut . Use <code>fix = TRUE</code> to fix "bad" complement

Value

character vector of Munsell colours

Examples

```
complement("5PB 2/4")
cols <- c("5PB 2/4", "5Y 7/8")
plot_mnsl(c(cols, complement(cols)))
```

complement_slice	<i>A vertical slice through the Munsell space</i>
------------------	---

Description

Plot a hue and its complement at all values and chromas

Usage

```
complement_slice(hue.name, back.col = "white")
```

Arguments

hue.name	character string of the desired hue.
back.col	colour for the background

Value

ggplot object

Examples

```
complement_slice("5PB")
complement_slice("5R")
complement_slice("10G")
```

darker

Make a munsell colour darker

Description

Decreases the value of the Munsell colour by 1.

Usage

```
darker(col, steps = 1)
```

Arguments

col	character vector of Munsell colours
steps	number of steps to take in decreasing value

Value

character vector of Munsell colours

Examples

```
darker("5PB 3/4")
cols <- c("5PB 3/4", "5Y 7/8")
p <- plot_mnsl(c(cols, darker(cols), darker(cols, 2)))
p + ggplot2::facet_wrap(~ names, ncol = 2)
```

desaturate	<i>Make a munsell colour less saturated</i>
------------	---

Description

Decreases the chroma of the Munsell colour by one step steps (multiples of 2).

Usage

```
desaturate(col, steps = 1)
```

Arguments

col	character vector of Munsell colours
steps	number of steps to take in decreasing chroma

Value

character vector of Munsell colours

Examples

```
desaturate("5PB 2/4")
cols <- c("5PB 2/6", "5Y 7/8")
p <- plot_mnsl(c(cols, desaturate(cols), desaturate(cols, 2)))
p + ggplot2::facet_wrap(~ names, ncol = 2)
```

hue_slice	<i>Plot all colours with the same hue</i>
-----------	---

Description

Plots slices of the Munsell colour system where hue is constant.

Usage

```
hue_slice(hue.name = "all", back.col = "white")
```

Arguments

hue.name	character vector of the desired hues. Or "all" for all hues.
back.col	colour for the background

Value

ggplot object

Examples

```
hue_slice("5R")
hue_slice(c("5R", "5P"))
## Not run: hue_slice("all")
```

hvc2mns1

Converts a hue, chroma and value to a Munsell colour

Description

Takes separate specifications of hue, value and chroma and returns the text specification of that colour.

Usage

```
hvc2mns1(hue, value = NULL, chroma = NULL, ...)
```

Arguments

hue	a character vector of Munsell hues, or a 3 column data frame containing the hue value and chroma levels
value	a numeric vector of values
chroma	a numeric vector of chromas
...	passed on to check_mns1 . Use <code>fix = TRUE</code> to fix "bad" colours

Details

Munsell colours are specified by hue, value and chroma. They take a form like "5PB 5/10" where the first characters represent the hue, followed by a space then the value and chroma separated by a "/". In this package value should be an integer in 0:10 and chroma an even number at most 24. Note that not all possible specifications result in representable colours. Regular recycling rules apply.

Value

a character string specification of a hex colour

See Also

[check_mns1](#), [mns12hex](#)

Examples

```
hvc2mns1("5PB", 5, 10)
# All values of 5PB with chroma 10
hvc2mns1("5PB", 1:9, 10) # note some are undefined
plot_mns1(hvc2mns1("5PB", 1:9, 10))
```

lighter *Make a munsell colour lighter*

Description

Increases the value of the Munsell colour.

Usage

```
lighter(col, steps = 1)
```

Arguments

col character vector of Munsell colours
steps number of steps to take in increasing value

Value

character vector of Munsell colours

Examples

```
lighter("5PB 2/4")  
cols <- c("5PB 2/4", "5Y 6/8")  
p <- plot_mnsl(c(cols, lighter(cols), lighter(cols, 2)))  
p + ggplot2::facet_wrap(~ names, ncol = 2)  
# lighter and darker are usually reversible  
lighter(darker("5PB 2/4"))  
# unless you try to pass though white or black  
lighter(darker("5PB 1/4"))
```

mns1 *Converts a Munsell colour to hex*

Description

Take a character string representation of a Munsell colour and returns the hex specification of that colour

Usage

```
mns1(col, ...)
```

Arguments

col a character string representing a Munsell colour.
... passed on to [check_mnsl](#). Use fix = TRUE to fix "bad" colours

Details

Munsell colours are specified by hue, value and chroma. They take a form like "5PB 5/10" where the first characters represent the hue, followed by a space then the value and chroma separated by a "/". In this package value should be an integer in 0:10 and chroma an even number at most 24. Note that not all possible specifications result in representable colours.

Value

a character string specification of a hex colour

See Also

[check_mns1](#), [hvc2mns1](#)

Examples

```
mns12hex("5PB 5/10")
# use a munsell colour in a plot
plot.new()
rect(0, 0, 1, 1, col = mns1("5R 5/10"))
```

mns12hvc

Converts a Munsell colour to a hue, chroma and value triplet

Description

Takes a text specification of a Munsell colour and returns the hue, chroma and value triplet.

Usage

```
mns12hvc(col, ...)
```

Arguments

`col` a character vector of Munsell colours
`...` passed on to [check_mns1](#). Use `fix = TRUE` to fix "bad" colours

Details

Munsell colours are specified by hue, value and chroma. They take a form like "5PB 5/10" where the first characters represent the hue, followed by a space then the value and chroma separated by a "/". In this package value should be an integer in 0:10 and chroma an even number at most 24. Note that not all possible specifications result in representable colours.

Value

a data frame with named columns hue, value and chroma containing the hue, value and chroma levels.

See Also

[check_mns1](#), [hvc2mns1](#)

Examples

```
mns12hvc("5PB 5/10")
hvc2mns1(mns12hvc("5PB 5/10"))
```

mns1_hues

Munsell hues

Description

Returns a character vector of the Munsell hues in hue order starting at 2.5R and excluding grey ("N").

Usage

```
mns1_hues()
```

Value

a character vector containing the hue values.

Examples

```
mns1_hues()
```

munsell

Munsell colour system.

Description

This package makes it easy to access and manipulate the colours in the munsell colour system. The conversion from munsell specifications to sRGB based on the renotation data from <http://www.cis.rit.edu/mcsl/online/munsell.php> which is a digitization of Table 1 in Newhall, Nickerson & Judd (1943). The code for conversion can be found in the package directory in `inst/raw/getmunsellmap.r`

References

S. M. Newhall, D. Nickerson, and D. B. Judd. Final report of the O.S.A. subcommittee on the spacing of the munsell colors. *J. Opt. Soc. Am.*, 33(7):385-411, 07 1943.

Munsell Renotation Data, RIT Munsell Color Science Laboratory. <http://www.cis.rit.edu/mcsl/online/munsell.php>

pbgyr *Change the hue of a munsell colour*

Description

Moves the hue of a munsell colour in the direction purple->blue->green->yellow->red->purple

Usage

```
pbgyr(col, steps = 1)
```

Arguments

col character vector of Munsell colours
 steps number of hue steps to take

Value

character vector of Munsell colours

Examples

```
my_red <- "2.5R 4/8"
pbgyr(my_red)
plot_mnsl(c(my_red, pbgyr(my_red, 2), pbgyr(my_red, 4)))
```

plot_closest *Plot closest Munsell colour to an sRGB colour*

Description

Take an sRGB colour and plots it along with the closest Munsell colour (using [rgb2mnsl](#) to find it)

Usage

```
plot_closest(R, G = NULL, B = NULL, back.col = "white")
```

Arguments

R a numeric vector of red values or a 3 column matrix with the proportions R, G, B in the columns.
 G numeric vector of green values
 B numeric vector of blue values
 back.col colour for the background

Value

ggplot object

See Also

[rgb2mns1](#)

Examples

```
plot_closest(0.1, 0.1, 0.3)
plot_closest(matrix(c(.1, .2, .4, .5, .6, .8), ncol = 3))
```

plot_hex	<i>Plot hex colours</i>
----------	-------------------------

Description

Quick way to look at a set of hex colours.

Usage

```
plot_hex(hex.colour, back.col = "white")
```

Arguments

hex.colour	character vector specifying colours in hex form
back.col	specification of background colour of display

Value

A ggplot object

Examples

```
plot_hex("#000000")
plot_hex(c("#000000", "#FFFFFF"))
```

plot_mns1

Plot a munsell colour

Description

Takes munsell text specifications and plots colour squares of them.

Usage

```
plot_mns1(cols, back.col = "white", ...)
```

Arguments

cols	character vector specifying colours in Munsell form
back.col	specification of background colour of display
...	passed to <code>check_mns1</code> . Add <code>fix = TRUE</code> to fix "bad" colours()

Value

A ggplot object

Examples

```
plot_mns1("5R 5/6")
plot_mns1("5R 5/6", back.col = "grey40")
p <- plot_mns1(c("5R 6/6", "5Y 6/6", "5G 6/6", "5B 6/6", "5P 6/6"),
  back.col = "grey40")
p
# returned object is a ggplot object so we can alter the layout
summary(p)
p + ggplot2::facet_wrap(~ num, nrow = 1)
```

rgb2mns1*Converts an sRGB colour to Munsell*

Description

Finds the closest Munsell colour (in LUV space) to the specified sRGB colour

Usage

```
rgb2mns1(R, G = NULL, B = NULL)
```

Arguments

R	a numeric vector of red values or a 3 column matrix with the proportions R, G, B in the columns.
G	numeric vector of green values
B	numeric vector of blue values

See Also

[plot_closest](#)

Examples

```
rgb2mns1(0.1, 0.1, 0.3)
rgb2mns1(matrix(c(.1, .2, .4, .5, .6, .8), ncol = 3))
plot_closest(matrix(c(.1, .2, .4, .5, .6, .8), ncol = 3))
```

rygbp

Change the hue of a munsell colour

Description

Moves the hue of a munsell colour in the direction red->yellow->green->blue->purple->red

Usage

```
rygbp(col, steps = 1)
```

Arguments

col	character vector of Munsell colours
steps	number of hue steps to take

Value

character vector of Munsell colours

Examples

```
my_red <- "10R 4/8"
rygbp(my_red)
plot_mns1(c(my_red, rygbp(my_red, 2), rygbp(my_red, 4)))
```

saturate	<i>Make a munsell colour more saturated</i>
----------	---

Description

Increases the chroma of the Munsell colour by step steps (multiples of 2).

Usage

```
saturate(col, steps = 1)
```

Arguments

col	character vector of Munsell colours
steps	number of steps to take in increasing chroma

Value

character vector of Munsell colours

Examples

```
saturate("5PB 2/4")
cols <- c("5PB 2/2", "5Y 7/6")
p <- plot_mnsl(c(cols, saturate(cols), saturate(cols, 2)))
p + ggplot2::facet_wrap(~ names, ncol = 2)
```

seq_mnsl	<i>Generate a sequence of Munsell colours</i>
----------	---

Description

Generates a sequence of Munsell colours. The sequence is generated by finding the closest munsell colours to a equidistant sequence of colours in # LUV space.

Usage

```
seq_mnsl(from, to, n, fix = FALSE)
```

Arguments

from	character string of first Munsell colour
to	character string of last Munsell colour
n	number of colours in sequence
fix	Should colours outside of the gamut be fixed? Passed on to fix_mnsl

Value

character vector of Munsell colours

Examples

```
seq_mnsl("5R 2/4", "5R 5/16", 4)
plot_mnsl(seq_mnsl("5R 2/4", "5R 5/16", 4))
plot_mnsl(seq_mnsl("5R 5/6",
  complement("5R 5/6"), 5))
```

value_slice

Plot all colours with the same value

Description

Plots slices of the Munsell colour system where value is constant.

Usage

```
value_slice(value.name = 1:10, back.col = "white")
```

Arguments

value.name	integer vector of the desired values.
back.col	colour for the background

Value

ggplot object

Examples

```
value_slice(2)
value_slice(c(2, 4))
# all values
## Not run: value_slice(1:10)
```

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