

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	<i>Make a munsell colour lighter</i>
---------	--------------------------------------

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	<i>Converts a Munsell colour to hex</i>
------	---

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 <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.

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 check_mns1 . Add fix = TRUE 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

Make a munsell colour more saturated

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

Generate a sequence of Munsell colours

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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