

Package ‘Spectran’

November 9, 2023

Title Visual and Non-Visual Spectral Analysis of Light

Version 1.0.3

Description Analyse light spectra for visual and non-visual (often called melanopic) needs, wrapped up in a Shiny App. 'Spectran' allows for the import of spectra in various CSV forms but also provides a wide range of example spectra and even the creation of own spectral power distributions. The goal of the app is to provide easy access and a visual overview of the spectral calculations underlying common parameters used in the field. It is thus ideal for educational purposes or the creation of presentation ready graphs in lighting research and application. 'Spectran' uses equations and action spectra described in CIE S026 (2018) <[doi:10.25039/S026.2018](https://doi.org/10.25039/S026.2018)>, DIN/TS 5031-100 (2021) <[doi:10.31030/3287213](https://doi.org/10.31030/3287213)>, and ISO/CIE 23539 (2023) <[doi:10.25039/ISO.CIE.23539.2023](https://doi.org/10.25039/ISO.CIE.23539.2023)>.

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Encoding UTF-8

RoxygenNote 7.2.3

Depends R (>= 2.10)

LazyData true

Imports chromote, colorSpec, cowplot, dplyr, gghighlight, ggplot2, ggrepel, ggridges, ggtext, grid, gt, htmltools, magrittr, openxlsx, pagedown, patchwork, png, purrr, readr, rlang, scales, shiny, shinyalert, shinydashboard, shinyFeedback, shinyjs, shinyWidgets, spacesXYZ, spsComps, stats, stringr, tibble, tidyr, tidysselect, utils, waiter, webshot2, withr

Suggests cooltools, here, magick, pkgload, readxl, rhub, rmarkdown, rsconnect

URL <https://github.com/LiTGde/Spectran>,
<https://litgde.github.io/Spectran/>

BugReports <https://github.com/LiTGde/Spectran/issues>

NeedsCompilation no

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ColorP	<i>Hex Color pallets for Spectran</i>
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Description

Contains named vectors of Hex color codes for Spectran's color pallets.

Usage

ColorP

Format

ColorP A list containing 5 elements, each a named vector of colors

Lang 401 colors along the spectrum that make a nice, yet nonaccurate representation of the visible spectrum. Created from a picture provided by Dieter Lang.

Lang_bright same as Lang but with a slightly brightened version of the picture. Strikes a nice balance between "accuracy" and "nice colors". Is the default when starting `Spectran()`

Dan_Bruton 401 colors along the spectrum that were made with the `cooltools::wavelength2col()` function and are based on Fortran Code by Dan_Bruton. Probably most accurate, but black at both spectral ends, which does not represent the colors themselves but also human sensitivity to them.

Rainbow 401 colors along the spectrum that make a vibrant and pleasing, yet nonaccurate representation of the visible spectrum. Created by the `grDevices::rainbow()` function.

Color_Rendering 14 colors that represent the reference colors used to determine the color rendering index.

Source

`grDevices::rainbow()`
`cooltools::wavelength2col()`
<https://github.com/LiTGde/Spectran/issues/14>

examplespectra	<i>Example spectra used by Spectran</i>
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Description

Contains Measurement and CIE Standard Illuminant Spectra. Additional data to the spectra can be found in the [examplespectra_descriptor](#) dataset.

Usage

examplespectra

Format

examplespectra A list of two elements, each containing a table of spectral data

Measurement Spectral data measured by a spectroradiometer. The unit of the wavelength (Wellenlaenge) is nm, the unit of the spectral data is W/m².

CIE Spectral data from the CIE describing Standard Illuminants. The unit of the wavelength (Wellenlaenge) is nm, the unit of the spectral data is W/m².

Source

<https://cie.co.at/data-tables>

examplespectra_descriptor	<i>Details on the example spectra used by Spectran</i>
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Description

Contains additional details on the measurement and CIE Standard Illuminant Spectra collected in [examplespectra](#).

Usage

examplespectra_descriptor

Format

`examplespectra_descriptor` A list with an element per language. The following description covers elements within each language element, which is a tibble with 11 rows and 8 columns.

Name Category of the spectrum (short)

Beschreibung Short description of the category of the spectrum

Identifier A list of character vectors containing the unique identifiers of each spectrum

Button_Name A list of character vectors containing the text to be displayed on the buttons for each spectrum

Dateinamen A list of character vectors containing the text used for the download-filenames

URL A character vector with URLs to videos giving some context to the measurements or NA, in which case nothing will be displayed

embargo A logical vector that indicates whether a special message should be displayed before downloading this spectrum

download A list of named character vectors containing a short description of the spectrum.

Source

<https://cie.co.at/data-tables>

Specs

Specifications for visual and nonvisual data wrangling and plotting

Description

Contains vectors and tables that are the main basis for the calculations Spectran does and also contain basic naming and coloring conventions.

Usage

Specs

Format

Specs A list with 7 elements

AS_wide A table of action spectra for the 5 human receptor types and $V(\lambda)$ from 1924. The table is in the wide format. The unit of the wavelength (Wellenlaenge) is nm, the unit of the action spectrum is 1 (dimensionless).

AS_long A table of action spectra for the 5 human receptor types and $V(\lambda)$ from 1924. The table is in the long format. The unit of the wavelength (Wellenlaenge) is nm, the unit of the action spectrum is 1 (dimensionless).

Efficacy A named vector of inverse values of efficacy of luminous radiation for the 5 human receptor types and $V(\lambda)$ from 1924. The unit is lm/W.

Alpha A list. `names` contains the names of the 5 human receptor types. `adjectives` contains these names in their adjective form for every languages included in Spectran. `descriptions` contains the descriptions used for tables and plotting. `abb` contains the abbreviations (if any) used for the equivalent daylight illuminance for that receptor type.

Vlambda A character scalar containing the properly escaped version of $V(\lambda)$, used e.g. in Plots

Alpha.ico A character scalar containing the properly escaped version of the sign α , used e.g. in Plots

Plot A table of Peak Wavelength (nm) values, Names, Abbreviations, and colors for the 5 human receptor types and $V(\lambda)$ from 1924. This table is mainly used for plotting.

Source

CIE S026

DIN/TS 5031-100

Spectran	<i>Unlock the Spectrum: Easy, Educational, and Engaging Analysis of Light Spectra</i>
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Description

Unlock the Spectrum: Easy, Educational, and Engaging Analysis of Light Spectra

Usage

```
Spectran(
  lang_setting = "English",
  lang_link = FALSE,
  color_palette = "Lang",
  ...
)
```

Arguments

<code>lang_setting</code>	A language for the application. Currently Deutsch for German and English (default) are implemented. Expects a <i>character</i> .
<code>lang_link</code>	Only relevant for the App deployed on <i>Shinyapps.io</i> . Handles whether a link to the German/English Version of the App is present in the header. Expects a <i>logical</i> (default FALSE)
<code>color_palette</code>	A color palette for the application. Currently <code>**Lang**</code> (default), <code>**Lang_bright**</code> , <code>**Dan_Bruton**</code> , and <code>**Rainbow**</code> are implemented. Expects a <i>character</i> . In terms of color accuracy, the decending order is likely <code>**Dan_Bruton**</code> , <code>**Lang**</code> , <code>**Lang_bright**</code> , and <code>**Rainbow**</code> . However, all of them are wrong in the sense, that monochromatic light can not well be recreated with RGB colors. Look at the documentation for ColorP for more information about these palettes.
<code>...</code>	Any other settings that get passed to <code>shinyApp</code>

Value

Open a viewer with the shiny app

Examples

```
if(interactive()) {  
  Spectran()  
  
  #try another language  
  if(interactive()) {  
    Spectran(lang_setting = "Deutsch")  
  
    #or try another color palette  
    if(interactive()) {  
      Spectran(color_palette = "Dan_Bruton")  
    }  
  }  
}
```

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* datasets

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