Package 'GrimR'

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Type Package

Title Calculate Optical Parameters from Spindle Stage Measurements

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Description Calculates optical parameters of crystals like the optical axes, the axis angle 2V, and the direction of the principal axes of the indicatrix from extinction angles measured on a spindle stage mounted on a polarisation microscope stage. Details of the method can be found in Dufey (2017) <arXiv:1703.00070>.

License GPL-3

RoxygenNote 6.0.1

LazyData true

Depends car, stats4

NeedsCompilation no

Repository CRAN

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R topics documented:

Bloss73 *Bloss73*

Description

Adularia data from: Bloss, F. D., and D. Riess. "Computer determination of 2V and indicatrix orientation from extinction data." American Mineralogist 58 (1973): 1052-1061.

Usage

```
data("Bloss73")
```

Format

A data frame with 19 observations on the following 2 variables.

`S` a numeric vector

`MS` a numeric vector

Examples

```
res<-fit.joel(Bloss73,MR=180.95,cw="ccw",optimMR=FALSE)
```

Carman *Data for Topaz by Carman*

Description

Data from F. Donald Bloss, "The spindle stage, principles and practice", Cambridge UP, Cambridge, 1981, p. 226, for Topaz provided by Prof. Carman.

Usage

```
data("Carman")
```

Format

A data frame with 36 observations of the following 2 variables.

`S` a numeric vector

`MS` a numeric vector

Examples

```
res<-fit.joel(Carman,cw="ccw",optimMR=TRUE)
```

excalibrII *excalibrII*

Description

Example data for Tiburon Albite from Bartelmehs, K. L., et al. "Excalibr II." Zeitschrift fuer Kristallographie 199.3-4 (1992): 185-196.

Usage

```
data("excalibrII")
```

Format

A data frame with 19 observations on the following 2 variables.

`S` a numeric vector

`MS` a numeric vector

Examples

```
res<-fit.joel(excalibrII,MR=180.15,cw="ccw",optimMR=FALSE)
```

fit.joel *Function fit.joel*

Description

Calculate the angle between the optical axes 2V, the optical axes in cartesian and polar coordinates and the principal axes of the dielectric tensor in cartesian and polar coordinates.

Usage

```
fit.joel(Data, MR = NULL, cw = c("ccw", "cw"),optimMR=FALSE)
```

Arguments

`Data`	(data frame) containing the spindle angles S and the extinction angles ES
`MR`	(numeric) The reference azimuth; If numeric and optimMR==TRUE, this value will be used as a starting value for further optimization. If NULL, a starting value will be guessed.
`cw`	(character) string "cw" for a clockwise graduated table, "ccw" for a counter-clockwise graduated table (default)
`optimMR`	(logical) If FALSE, the provided MR will be used without further refinement, if TRUE, the MR will be refined so as to minimize the deviance

Value

(list) with elements:

coeffs	list of the fitted parameters
covmat	matrix of covariances of the parameters
delta2V	list of estimate of 2V, its standard deviation and upper and lower confidence limits
kart	data frame with cartesian coordinates of the axes, sd, and confidence intervals
sphaer	data frame with S and ES values of the axes, sd, and confidence intervals
principal	data frame with S and MS angles to bring axes into extinction
Extinctions	data frame with S, MS, ES, calculated ES and ES-ES calculated
Wulffdat	data necessary to create a plot on the Wulff stereonet

Author(s)

Florian Dufey <GrimR@gmx.de>

Examples

```
# With 360 deg. data:
res<-fit.joel(Carman,MR=NULL,cw="ccw",optimMR=TRUE)
Wulffplot(res) #Plot data on a Wulff net
#with 180 degree data:
res<-fit.joel(Gunter,MR=-0.89,cw="cw",optimMR=FALSE)
Wulffplot(res) #Plot data on a Wulff net
```

Gunter *Data from Gunter et al.*

Description

Gunter, Mickey E., et al. "Results from a McCrone spindle stage short course, a new version of EXCALIBR, and how to build a spindle stage." MICROSCOPE-LONDON THEN CHICAGO-. 52.1 (2004): 23-39.

Usage

```
data("Gunter")
```

Format

A data frame with 19 observations on the following 2 variables.

S a numeric vector

MS a numeric vector

Examples

```
res<-fit.joel(Gunter,MR=-0.89,cw="cw",optimMR=FALSE)
```

`pcirc` *Circle Plot*

Description

Add a circle to a plot, with cross-hairs

Usage

```
pcirc(gcol = "black", border = "black", ndiv = 36)
```

Arguments

`gcol`	color of crosshairs
`border`	border color
`ndiv`	number of divisions for the circle

Value

no return values, used for side effects

Author(s)

Jonathan M. Lees <jonathan.lees@unc.edu>

Examples

```
plot(c(-1,1),c(-1,1))
pcirc(gcol = "black", border = "black", ndiv = 36)
```

`Wulffnet` *Function Wulffnet*

Description

Function Wulffnet Plot a Wulffnet modified from RFOC package; Wulff net rotated

Usage

```
Wulffnet(add = FALSE, col = gray(0.7), border = "black", lwd = 1)
```

Arguments

add	Logical, TRUE=add to existing plot
col	color
border	border color
lwd	line width

Details

Plots equal-angle stereonet as opposed to equal-area. In comparison to the original Wnet function from RFOC package, Wulff net is rotated by 90 degrees so as to conform with custom in mineralogy.

Value

graphical side effects

Author(s)

Jonathan M. Lees <jonathan.lees@unc.edu>, Florian Dufey <GrimR@gmx.de>

Examples

```
Wulffnet(add = FALSE, col = gray(0.7), border = "black", lwd = 1)
```

Wulffplot *Function Wulffplot*

Description

Function Wulffplot Plot the S and ES values of measured points calculated points and of all axes on a Wulff stereonet

Usage

```
Wulffplot(x)
```

Arguments

x	(list) Output list from the fit.joel function

Author(s)

Florian Dufey <GrimR@gmx.de>

Examples

```
res<-fit.joel(Gunter,MR=-0.89,cw="cw",optimMR=FALSE)
Wulffplot(res)
```

`Wulffpoint` *Function Wulffpoint Plots Points in the Wulffnet given S and ES*

Description

Function Wulffpoint Plots Points in the Wulffnet given S and ES

Usage

```
Wulffpoint(ES, S, col = 2, pch = 5, bg="white" , lab = "")
```

Arguments

`ES`	(numeric) azimuth (extinction angle) in degrees
`S`	(numeric) spindle angle in degrees
`col`	color
`pch`	symbol type
`lab`	label
`bg`	background colour of symbol

Author(s)

Florian Dufey <GrimR@gmx.de>

See Also

Wnet

Examples

```
Wulffnet()
Wulffpoint(23, 34)
```

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