Package 'celestial'

July 2, 2014

Type Package

Title Collection of common astronomical conversion routines.

Version 1.1

Date 2013-08-08

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Description This package includes a number of common astronomy conversion routines, particularly the HMS and degrees schemes, which can be fiddly to convert between on mass due to the textural nature of the former.

License GPL-2

NeedsCompilation no

Repository CRAN

Date/Publication 2013-08-10 09:46:01

R topics documented:

celestial-package *Celestial coordinate conversion functions.*

Description

Various functions for converting between commonly used coordinate systems in astronomy.

Details

Package:	celestial
Type:	Package
Version:	1.1
Date:	2013-08-08
License:	GPL-2

There are a number of functions included, but the most useful for astronomy conversions are the decimal degrees to DMS/HMS formats used at many telescopes: deg2dms, deg2hms, dms2deg, hms2deg.

Author(s)

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deg2dms *Convert decimal degrees to dms format.*

Description

Convert decimal degrees to dms (degrees, minutes, seconds) format. This is probably most useful for declination conversion, since dms is fairly standard method of presenting declination coordinates. The decimal degrees=d+m/60+s/3600. Degrees should range from -90 to +90.

Usage

```
deg2dms(deg,type='mat',sep=':')
```

Arguments

deg	The decimal degrees you are converting. All deg values should be -90<=deg<=90
type	The output type desired. If 'mat' then the output is a 3 column data.frame where column 1 is the degree, column 2 is the minutes and column 3 is the seconds. If 'cat' then the output is a single vector of strings where the separator is defined by the 'sep' argument.

sep	Defines the type of separator used when type='cat'. Any value other than 'DMS' and 'dms' is used for all separations, so the default ':' would produce an output like 3:34:45.5. If set to 'dms' or 'DMS' then the output is of the format 3d34m45.5s and 3D34M45.5s resepctively.

Value

A data.frame with the columns degrees, minutes and seconds if type='mat'. If type='cat' then a vector of strings with separators defined by the 'sep' argument.

Author(s)

Aaron Robotham

See Also

dms2deg

Examples

```
print(deg2dms(12.345))
print(deg2dms(12.345,type='cat',sep=':'))
print(deg2dms(12.345,type='cat',sep='dms'))
print(deg2dms(12.345,type='cat',sep='DMS'))
```

---

deg2hms *Convert decimal degrees to hms format.*

Description

Convert decimal degrees to hms (hours, minutes, seconds) format. This is probably most useful for right-ascension (RA) conversion, since hms is fairly standard method of presenting RA coordinates. The decimal degrees=15*h+15*m/60+15*s/3600 (i.e. there are 24 hours in 360 degrees). Degrees should range from 0 to 360.

Usage

```
deg2hms(deg,type='mat',sep=':')
```

Arguments

deg	The decimal degrees you are converting. All deg values should be 0<=d<=360.
type	The output type desired. If 'mat' then the output is a 3 column data.frame where column 1 is the degree, column 2 is the minutes and column 3 is the seconds. If 'cat' then the output is a single vector of strings where the separator is defined by the 'sep' argument.

sep — Defines the type of separator used when type='cat'. Any value other than 'DMS' and 'dms' is used for all separations, so the default ':' would produce an output like 3:34:45.5. If set to 'hms' or 'HMS' then the output is of the format 3h34m45.5s and 3H34M45.5s resepctively.

Value

A data.frame with the columns degrees, minutes and seconds if type='mat'. If type='cat' then a vector of strings with separators defined by the 'sep' argument.

Author(s)

Aaron Robotham

See Also

hms2deg

Examples

```
print(deg2hms(123.456))
print(deg2hms(123.456,type='cat',sep=':'))
print(deg2hms(123.456,type='cat',sep='hms'))
print(deg2hms(123.456,type='cat',sep='HMS'))
```

---

dms2deg *Convert DMS to degrees format.*

Description

Convert DMS (degrees, minutes, seconds) to degrees format. This is probably most useful for declination conversion, since dms is fairly standard method of presenting declination coordinates. The decimal degrees=d+m/60+s/3600. Degrees should range from -90 to +90. Degrees and minutes should be integer and seconds can be decimal.

Usage

```
dms2deg(d,m,s,sign='d',sep=':')
```

Arguments

d — The integer number of degrees you are converting. If it is not integer then the floor of the number is taken. This can contain the sign of the declination when sign='d', but must be all positive if the sign argument is specified (this is required if d contains any 0s, see below). If sign is specified, all d values should be 0<=d<=90, otherwise d values should be 0<=d<=90.

m — The integer number of minutes you are converting. If it is not integer then the floor of the number is taken. All m values should be 0<=m<60.

s	The decimal number of seconds you are converting. All s values should be 0<=s<60.
sign	The sign of the declination. The default 'd' inherits the sign of the d argument. This is ambiguous when d is 0 since the sign of +/-0 is taken to be 0. If d contains any 0s, you must supply a vector of the same length as d with +ve or -ve values (e.g. +/- 1), the sign of these value will be taken as the sign for the declination.
sep	Defines the type of separator used when 'd' is a vector of strings. Any value other than 'DMS' and 'dms' is used for all separations, so the default ':' would be for an input like 3:34:45.5. If set to 'dms' or 'DMS' then the output is of the format 3d34m45.5s and 3D34M45.5s resepctively.

Value

A value of decimal degrees.

Author(s)

Aaron Robotham

See Also

deg2dms

Examples

```
print(dms2deg(70,45,19,-1))
print(dms2deg('-70:45:19'))
print(dms2deg('-70d45m19s',sep='dms'))
print(dms2deg(c('-70D45M19S','3D5M15S'),sep='DMS'))
```

---

hms2deg *Convert hms to degrees format.*

Description

Convert hms (hours, minutes, seconds) to degrees format. This is probably most useful for right ascension (RA) conversion, since hms is fairly standard method of presenting RA coordinates. The decimal degrees=15*h+15*m/60+15*s/3600. Should range between 0 and 24 hours. Hours and minutes should be integer and seconds can be decimal.

Usage

```
hms2deg(h,m,s,sep=':')
```

Arguments

h	The integer number of hours you are converting. If it is not integer then the floor of the number is taken. All m values should be 0<=h<=24.
m	The integer number of minutes you are converting. If it is not integer then the floor of the number is taken. All m values should be 0<=m<60.
s	The decimal number of seconds you are converting. All s values should be 0<=s<60.
sep	Defines the type of separator used when 'h' is a vector of strings. Any value other than 'HMS' and 'hms' is used for all separations, so the default ':' would be for an input like 3:34:45.5. If set to 'hms' or 'HMS' then the output is of the format 3h34m45.5s and 3H34M45.5s resepctively.

Value

A value of decimal degrees.

Author(s)

Aaron Robotham

See Also

deg2hms

Examples

```
print(hms2deg(12,10,36))
print(hms2deg('12:10:36'))
print(hms2deg('12h10m36s',sep='hms'))
print(hms2deg(c('12H10M36S','3H4M10S'),sep='HMS'))
```

IAUID *IAU name creator.*

Description

Creates IAU legal names for objects given coordinates, name and epoch.

Usage

```
IAUID(ra, dec, name = "GAMA", epoch = "J")
```

Arguments

ra	The decimal degrees right ascension.
dec	The decimal degrees declination.
name	Name to be appended to IAU designation as a string.
epoch	Epoch, i.e. 'J' (default) or 'B'. Enter as a string.

Value

Text string that outputs an IAU legal name for an object.

Author(s)

Aaron Robotham

Examples

```
print(IAUID(123.45,67.89,'GAMA','J'))
```

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