Package 'eddington'

October 13, 2022

Title Compute a Cyclist's Eddington Number

Version 2.1.1

Description Compute a cyclist's Eddington number, including efficiently computing cumulative E over a vector. A cyclist's Eddington number <https://en.wikipedia.org/wiki/Arthur_Eddington#Eddington_number_for_cycling> is the maximum number satisfying the condition such that a cyclist has ridden E miles or greater in E days. The algorithm in this package is an improvement over the conventional approach because both summary statistics and cumulative statistics can be computed in linear time, since it does not require initial sorting of the data. These functions may also be used for computing h-indices for authors, a metric described by Hirsch (2005) <doi:10.1073/pnas.0507655102>. Both are specific applications of computing the side length of a Durfee square <https://en.wikipedia.org/wiki/Durfee_square>.

License GPL (>= 2)

Encoding UTF-8

LazyData true

Depends R (>= 3.4.0)

LinkingTo Rcpp

Imports Rcpp

Suggests testthat, knitr, rmarkdown, dplyr

VignetteBuilder knitr

RoxygenNote 7.1.0

URL https://github.com/pegeler/eddington2

BugReports https://github.com/pegeler/eddington2/issues

NeedsCompilation yes

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Repository CRAN

Date/Publication 2020-03-24 16:30:05 UTC

R topics documented:

`E_cum` *Calculate the cumulative Eddington number*

Description

This function is much like `E_num` except it provides a cumulative Eddington number over the vector rather than a single summary number.

Usage

```
E_cum(rides)
```

Arguments

`rides`	A vector of mileage, where each element represents a single day.

Value

An integer vector the same length as `rides`.

See Also

`E_next`, `E_num`, `E_req`, `E_sat`

`E_next` *Get the number of rides required to increment to the next Eddington number*

Description

Get the number of rides required to increment to the next Eddington number.

Usage

```
E_next(rides)
```

Arguments

rides	A vector of mileage, where each element represents a single day.

Value

A named list with the current Eddington number (E) and the number of rides required to increment by one (req).

See Also

E_cum, E_num, E_req, E_sat

E_num *Get the Eddington number for cycling*

Description

Gets the Eddington number for cycling. The Eddington Number for cycling, *E*, is the maximum number where a cyclist has ridden *E* miles in *E* days.

Usage

```
E_num(rides)
```

Arguments

rides	A vector of mileage, where each element represents a single day.

Details

The Eddington Number for cycling is related to computing the rank of an integer partition, which is the same as computing the side length of its Durfee square. Another relevant application of this metric is computing the Hirsch index for publications.

This is not to be confused with the Eddington Number in astrophysics, N_{Edd}, which represents the number of protons in the observable universe.

Value

An integer which is the Eddington cycling number for the data provided.

See Also

E_cum, E_next, E_req, E_sat

Examples

```
# Randomly generate a set of 15 rides
rides <- rgamma(15, shape = 2, scale = 10)

# View the rides sorted in decreasing order
setNames(sort(rides, decreasing = TRUE), seq_along(rides))

# Get the Eddington number
E_num(rides)
```

E_req *Determine the number of additional rides required to achieve a specified Eddington number*

Description

Determine the number of additional rides required to achieve a specified Eddington number.

Usage

```
E_req(rides, candidate)
```

Arguments

rides	A vector of mileage, where each element represents a single day.
candidate	The Eddington number to test for.

Value

An integer vector of length 1. Returns `0L` if E is already achieved.

See Also

E_cum, E_next, E_num, E_sat

E_sat *Determine if a dataset satisfies a specified Eddington number*

Description

Indicates whether a certain Eddington number is satisfied, given the data.

Usage

```
E_sat(rides, candidate)
```

Arguments

`rides`	A vector of mileage, where each element represents a single day.
`candidate`	The Eddington number to test for.

Value

A logical vector of length 1.

See Also

`E_cum`, `E_next`, `E_num`, `E_req`

`rides` *A year of simulated bicycle ride mileages*

Description

Simulated dates and distances of rides occurring in 2009.

Usage

```
rides
```

Format

A data frame with 250 rows and 2 variables:

ride_date date the ride occurred

ride_length the length in miles

Details

The dataset contains a total of 3,419 miles spread across 178 unique days. The Eddington number for the year was 29.

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