

Package: kinematics (via r-universe)

September 7, 2024

Type Package

Title Studying Sampled Trajectories

Version 1.0.0

Author Pablo Rodriguez-Sanchez (<https://pabrod.github.io>) and Sanne J. P. van den Berg (<https://www.wur.nl/en/Persons/Sanne-dr.-SJP-Sanne-van-den-Berg.htm>)

Maintainer Pablo Rodriguez-Sanchez <pablo.rodriguez.sanchez@gmail.com>

Description Allows analyzing time series representing two-dimensional movements. It accepts a data frame with a time (t), horizontal (x) and vertical (y) coordinate as columns, and returns several dynamical properties such as speed, acceleration or curvature.

License MIT + file LICENSE

Encoding UTF-8

LazyData true

RoxygenNote 7.3.1

VignetteBuilder knitr

Suggests testthat, knitr, utils, markdown, rmarkdown, ggplot2, pkgdown

Imports numDeriv, stats

Depends R (>= 3.5)

URL <https://pabrod.github.io/kinematics/>

Repository <https://pabrod.r-universe.dev>

RemoteUrl <https://github.com/pabrod/kinematics>

RemoteRef HEAD

RemoteSha 5b1df31b979e4b77468be93bbc1f77593a1082f2

Contents

accel	2
append_displacement	3

append_dynamics	3
approx_derivative	4
curvature	4
curvature_radius	5
displacement	5
example_mov	6
get_polar_coordinates	6
speed	7
Index	8

accel	<i>Return accelerations</i>
-------	-----------------------------

Description

Return accelerations

Usage

accel(t, x, y)

Arguments

t	The times vector
x	The x positions
y	The y positions

Value

The accelerations

See Also

[speed](#), [approx_derivative](#)

append_displacement	<i>Return a dataframe with information about the time-to-time displacements</i>
---------------------	---------------------------------------------------------------------------------

Description

The displacement is a bit more complicated than other dynamical variables, as it depends on the sampling frequency. If you are subsampling, always re-run `append_displacement` after subsampling.

Usage

```
append_displacement(data)
```

Arguments

`data` A dataframe containing t, x and y

Value

A data frame including all the dynamical information, including displacements

See Also

[append_dynamics](#), [speed](#)

append_dynamics	<i>Return a data frame with extra columns with dynamical information</i>
-----------------	--------------------------------------------------------------------------

Description

Return a data frame with extra columns with dynamical information

Usage

```
append_dynamics(data, append.displacement = TRUE)
```

Arguments

`data` A dataframe containing t, x and y

`append.displacement`

(Optional) Set it to `FALSE` to not calculate displacements. Useful if the data is going to be resampled

Value

A data frame including instantaneous dynamical variables, such as speed and acceleration

See Also

[speed](#), [accel](#), [append_displacement](#)

`approx_derivative` *Approximate derivative*

Description

Approximate derivative

Usage

```
approx_derivative(t, x)
```

Arguments

<code>t</code>	Vector of times
<code>x</code>	Vector of values

Value

A vector (of the same size of `t`) representing the numerical derivative

See Also

[speed](#), [accel](#)

`curvature` *Return curvatures*

Description

Return curvatures

Usage

```
curvature(t, x, y)
```

Arguments

<code>t</code>	The times vector
<code>x</code>	The x positions
<code>y</code>	The y positions

Value

The local curvature

See Also

[speed](#), [accel](#), [curvature_radius](#)

curvature_radius	<i>Return curvature radius</i>
------------------	--------------------------------

Description

Return curvature radius

Usage

```
curvature_radius(t, x, y)
```

Arguments

t	The times vector
x	The x positions
y	The y positions

Value

The local curvature radius

See Also

[speed](#), [accel](#), [curvature](#)

displacement	<i>Return displacements</i>
--------------	-----------------------------

Description

Return displacements

Usage

```
displacement(x, y)
```

Arguments

x	The x positions
y	The y positions

Value

The displacements between a position and its previous

example_mov	<i>Example data set</i>
-------------	-------------------------

Description

Experimental sample of 3000 positions of a macroinvertebrate

Format

A data frame with 3000 observations of:

x	horizontal position
y	vertical position
t	time ...

get_polar_coordinates	<i>Get polar coordinates</i>
-----------------------	------------------------------

Description

Get polar coordinates

Usage

```
get_polar_coordinates(x, y, origin = c(0, 0))
```

Arguments

x	Vector of x coordinates
y	Vector of y coordinates
origin	(Default = c(0, 0)) Position of the origin of coordinates

Value

Data frame with radius (r) and angle vectors (th)

speed	<i>Return speeds</i>
-------	----------------------

Description

Return speeds

Usage

speed(t, x, y)

Arguments

t	The times vector
x	The x positions
y	The y positions

Value

The speeds

See Also

[accel](#), [approx_derivative](#)

Index

accel, [2](#), [4](#), [5](#), [7](#)

append_displacement, [3](#), [4](#)

append_dynamics, [3](#), [3](#)

approx_derivative, [2](#), [4](#), [7](#)

curvature, [4](#), [5](#)

curvature_radius, [5](#), [5](#)

displacement, [5](#)

example_mov, [6](#)

get_polar_coordinates, [6](#)

speed, [2-5](#), [7](#)