Package 'kinematics'

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Type Package

Title Studying Sampled Trajectories

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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.

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Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

VignetteBuilder knitr

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

Imports numDeriv, stats

Depends R (>= 3.5.0)

NeedsCompilation no

Repository CRAN

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Contents

`accel` *Return accelerations*

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` *Return a dataframe with information about the time-to-time displacements*

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

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append_dynamics *Return a data frame with extra columns with dynamical information*

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

t	Vector of times
x	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

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

Value

The local curvature

See Also

speed, accel, curvature_radius

curvature_radius *Return curvature radius*

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 *Return displacements*

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 *Example data set*

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 *Get polar coordinates*

Description

Get polar coordinates

Usage

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

Arguments

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

Value

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

speed *Return speeds*

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

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