Package ‘kinematics’

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Type Package

Title Studying Sampled Trajectories

Version 1.0.0


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.

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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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**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`

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**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)`
append_dynamics

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

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  

**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  

**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
**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

---

**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
**get_polar_coordinates**

---

**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**

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**Description**  
Get polar coordinates

**Usage**  

```r
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
\begin{itemize}
  \item \texttt{t} \quad The times vector
  \item \texttt{x} \quad The x positions
  \item \texttt{y} \quad The y positions
\end{itemize}

Value
The speeds

See Also
\texttt{accel, approx_derivative}
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