

# Package ‘stabilo’

July 23, 2025

**Type** Package

**Title** Stabilometric Signal Quantification

**Version** 0.1.1

**Description** Functions for stabilometric signal quantification.

The input is a data frame containing the x, y coordinates of the center-of-pressure displacement.

Jose Magalhaes de Oliveira (2017) <[doi:10.3758/s13428-016-0706-4](https://doi.org/10.3758/s13428-016-0706-4)> ``Statokinesigram normalization method";

T E Prieto, J B Myklebust, R G Hoffmann, E G Lovett, B M Mykle-

bust (1996) <[doi:10.1109/10.532130](https://doi.org/10.1109/10.532130)> ``Measures of postural steadiness: Differences between healthy young and elderly adults";

L F Oliveira et al (1996) <[doi:10.1088/0967-3334/17/4/008](https://doi.org/10.1088/0967-3334/17/4/008)> ``Calculation of area of stabilometric signals using principal component analysis".

**License** GPL-3

**Encoding** UTF-8

**Imports** ggplot2, pracma, stats

**RoxygenNote** 7.2.3

**NeedsCompilation** no

**Author** Jose Oliveira [aut, cre] (ORCID:

<<https://orcid.org/0000-0002-6338-9792>>)

**Maintainer** Jose Oliveira <josemagalhaesdeoliveira@gmail.com>

**Repository** CRAN

**Date/Publication** 2023-01-06 22:10:02 UTC

## Contents

|                           |   |
|---------------------------|---|
| sttkangle . . . . .       | 2 |
| sttkarea . . . . .        | 3 |
| sttkeccentr . . . . .     | 4 |
| sttkellipseplot . . . . . | 5 |
| sttklength . . . . .      | 6 |
| sttknorm . . . . .        | 7 |
| sttksd . . . . .          | 8 |

|             |    |
|-------------|----|
| sttksdym    | 9  |
| sttkveloc   | 10 |
| sttkxmdfreq | 11 |
| sttkxveloc  | 12 |
| sttkymdfreq | 13 |
| sttkyveloc  | 14 |

|       |    |
|-------|----|
| Index | 15 |
|-------|----|

---

|           |                                                  |
|-----------|--------------------------------------------------|
| sttkangle | <i>Quantifies the Angle of a Statokinesigram</i> |
|-----------|--------------------------------------------------|

---

**Description**

Computes the angle of of a given statokinesigram, with respect to the x axis, by fitting an ellipse containing 95 percent of statokinesigram’s points.

**Usage**

```
sttkangle(dados)
```

**Arguments**

dados                      data frame with two columns "x" and "y"

**Details**

’dados’ is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

**Value**

The angle, in degrees, of the fitted ellipse on the given statokinesigram sttkangle.

**Author(s)**

Jose Magalhaes de Oliveira

**See Also**

[sttkarea](#), [sttkellipseplot](#)

**Examples**

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPangle <- sttkangle(COP)
```

---

|          |                                                                                   |
|----------|-----------------------------------------------------------------------------------|
| sttkarea | <i>Quantifies the Area of a Statokinesigram (Center-of-Pressure displacement)</i> |
|----------|-----------------------------------------------------------------------------------|

---

## Description

Computes the area of of a given statokinesigram by fitting an ellipse containing 95 percent of statokinesigram's points.

## Usage

```
sttkarea(dados)
```

## Arguments

|       |                                         |
|-------|-----------------------------------------|
| dados | data frame with two columns "x" and "y" |
|-------|-----------------------------------------|

## Details

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

## Value

The area of the given statokinesigram sttkarea.

## Author(s)

Jose Magalhaes de Oliveira

## See Also

[sttkangle](#), [sttkellipseplot](#)

## Examples

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COParea <- sttkarea(COP)
```

---

`sttkeccentr`*Estimates the Eccentricity of a Statokinesigram.*

---

**Description**

Computes the eccentricity of the confidence ellipse of a given statokinesigram.

**Usage**

```
sttkeccentr(dados)
```

**Arguments**

`dados` data frame with two columns "x" and "y"

**Details**

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

**Value**

The eccentricity of the given statokinesigram `eccentr`.

**Author(s)**

Jose Magalhaes de Oliveira

**See Also**

[sttkangle](#), [sttkarea](#)

**Examples**

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPeccentr <- sttkeccentr(COP)
```

---

sttkellipseplot*Points of the Confidence Ellipse of a Statokinesigram*

---

**Description**

Computes the contour of the confidence ellipse of a given statokinesigram, containing 95 percent of statokinesigram's points.

**Usage**

```
sttkellipseplot(dados)
```

**Arguments**

`dados` data frame with two columns "x" and "y"

**Details**

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

**Value**

The contour of the ellipse fitted to the given statokinesigram `ellctr`.

**Author(s)**

Jose Magalhaes de Oliveira

**See Also**

[sttkangle](#), [sttkellipseplot](#)

**Examples**

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPellipseplot <- sttkellipseplot(COP)
```

---

|            |                                                                                         |
|------------|-----------------------------------------------------------------------------------------|
| sttklength | <i>Quantifies the length of a given Center-of-pressure trajectory (statokinesigram)</i> |
|------------|-----------------------------------------------------------------------------------------|

---

## Description

Computes the length of of a given Center-of-pressure trajectory.

## Usage

```
sttklength(dados)
```

## Arguments

dados                      data frame with two columns "x" and "y"

## Details

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

## Value

The length of the given COP trajectory sttklength.

## Author(s)

Jose Magalhaes de Oliveira

## See Also

[sttkangle](#), [sttkellipseplot](#)

## Examples

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPlength <- sttklength(COP)
```

---

|          |                                      |
|----------|--------------------------------------|
| sttknorm | <i>Standardizes Statokinesigrams</i> |
|----------|--------------------------------------|

---

## Description

confines a given statokinesigram in a circumference of radius equal to 1, without spatially distorting its shape. The circumference contains 95 percent of statokinesigram's points.

## Usage

```
sttknorm(dados)
```

## Arguments

|       |                                         |
|-------|-----------------------------------------|
| dados | data frame with two columns "x" and "y" |
|-------|-----------------------------------------|

## Details

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

## Value

The normalized statokinesigram stknorm.

## Author(s)

Jose Magalhaes de Oliveira

## See Also

[sttkarea](#), [sttklength](#)

## Examples

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPnorm <- sttknorm(COP)
```

sttksdx

*Quantifies the Lateral Sway Amplitude of a Statokinesigram*

---

**Description**

Computes the standard deviation of lateral displacement of the center of pressure.

**Usage**

```
sttksdx(dados)
```

**Arguments**

dados                      data frame with two columns "x" and "y"

**Details**

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

**Value**

The standard deviation of x sdx.

**Author(s)**

Jose Magalhaes de Oliveira

**See Also**

[sttksd](#), [sttkangle](#)

**Examples**

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPxsd <- sttksdx(COP)
```

---

sttksdym*Quantifies the front-and-back Sway Amplitude of a Statokinesigram*

---

**Description**

Computes the standard deviation of front-and-back displacement of the center of pressure.

**Usage**

```
sttksdym(dados)
```

**Arguments**

`dados` data frame with two columns "x" and "y"

**Details**

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

**Value**

The standard deviation of y sdy.

**Author(s)**

Jose Oliveira

**See Also**

[sttksdym](#), [sttkellipseplot](#)

**Examples**

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPsdy <- sttksdym(COP)
```

sttkveloc

*Velocity of a Center-of-pressure displacement***Description**

Computes the mean velocity of a given Center-of-pressure displacement in the horizontal plane.

**Usage**

```
sttkveloc(dados, fs)
```

**Arguments**

|       |                                               |
|-------|-----------------------------------------------|
| dados | Data frame with two columns "x" and "y"       |
| fs    | The sampling frequency used in data recording |

**Details**

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center-of-pressure acquired in a period of time.

**Value**

The velocity of the COP displacement sttkveloc.

**Author(s)**

Jose Magalhaes de Oliveira

**See Also**

[sttkangle](#), [sttkellipseplot](#)

**Examples**

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)
fs <- 50

COPvelocity <- sttkveloc(COP,fs)
```

---

sttkxmdfreq

*Quantifies the Median Frequency of the Lateral Displacement of COP.*


---

## Description

Computes the median frequency of the lateral displacement of the center of pressure.

## Usage

```
sttkxmdfreq(dados, sampfreq)
```

## Arguments

|                       |                                         |
|-----------------------|-----------------------------------------|
| <code>dados</code>    | data frame with two columns "x" and "y" |
| <code>sampfreq</code> | number The sampling frequency           |

## Details

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

## Value

The median frequency of the x displacement for the given statokinesigram FMx.

## Author(s)

Jose Magalhaes de Oliveira

## See Also

[sttkangle](#), [sttkellipseplot](#)

## Examples

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPxmdfreq <- sttkxmdfreq(COP, 50)
```

---

sttkxveloc

*Mean lateral velocity of Center-of-pressure displacement*


---

## Description

Computes the mean lateral velocity of a given Center-of-pressure displacement.

## Usage

```
sttkxveloc(dados, fs)
```

## Arguments

|       |                                               |
|-------|-----------------------------------------------|
| dados | Data frame with two columns "x" and "y"       |
| fs    | The sampling frequency used in data recording |

## Details

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center-of-pressure acquired in a period of time.

## Value

The lateral velocity of the COP displacement sttkxveloc.

## Author(s)

Jose Magalhaes de Oliveira

## See Also

[sttkangle](#), [sttkellipseplot](#)

## Examples

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)
fs <- 50

COPxvelocity <- sttkxveloc(COP,fs)
```

---

|             |                                                                                    |
|-------------|------------------------------------------------------------------------------------|
| sttkymdfreq | <i>Quantifies the Median Frequency of the Anteroposterior Displacement of COP.</i> |
|-------------|------------------------------------------------------------------------------------|

---

## Description

Computes the median frequency of the anteroposterior displacement of the center of pressure.

## Usage

```
sttkymdfreq(dados, sampfreq)
```

## Arguments

|          |                                         |
|----------|-----------------------------------------|
| dados    | data frame with two columns "x" and "y" |
| sampfreq | number The sampling frequency           |

## Details

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center of pressure acquired in a period of time.

## Value

The median frequency of the y displacement for the given statokinesigram FMy.

## Author(s)

Jose Magalhaes de Oliveira

## See Also

[sttkangle](#), [sttkellipseplot](#)

## Examples

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)

COPymdfreq <- sttkymdfreq(COP, 50)
```

---

sttkyveloc

---

*Mean front-to-back velocity of Center-of-pressure displacement*


---

### Description

Computes the mean front-to-back velocity of a given Center-of-pressure displacement.

### Usage

```
sttkyveloc(dados, fs)
```

### Arguments

|       |                                               |
|-------|-----------------------------------------------|
| dados | Data frame with two columns "x" and "y"       |
| fs    | The sampling frequency used in data recording |

### Details

'dados' is a data frame containing two columns named "x" and "y". The pairs (x, y) are the coordinates of the center-of-pressure acquired in a period of time.

### Value

The velocity of the front-to-back COP displacement sttkyveloc.

### Author(s)

Jose Magalhaes de Oliveira

### See Also

[sttkangle](#), [sttkellipseplot](#)

### Examples

```
x <- c(1,3,7,5,9,4,3,6,8,2,8,9,4,5,7,3,4,7,9,3,2,5,3,4,8,2,9,7,4,2)
y <- c(6,3,9,1,3,7,4,9,6,1,7,3,9,7,2,6,3,4,8,1,9,3,6,8,1,6,2,9,8,3)

COP <- data.frame(x, y)
fs <- 50

COPvelocity <- sttkyveloc(COP,fs)
```

# Index

sttkangle, [2](#), [3–6](#), [8](#), [10–14](#)  
sttkarea, [2](#), [3](#), [4](#), [7](#)  
sttkeccentr, [4](#)  
sttkellipseplot, [2](#), [3](#), [5](#), [5](#), [6](#), [9–14](#)  
sttklength, [6](#), [7](#)  
sttknorm, [7](#)  
sttksd<sub>x</sub>, [8](#), [9](#)  
sttksd<sub>y</sub>, [8](#), [9](#)  
sttkveloc, [10](#)  
sttkxmdfreq, [11](#)  
sttkxveloc, [12](#)  
sttkymdfreq, [13](#)  
sttkyveloc, [14](#)