

# Package ‘RMSD’

January 20, 2025

**Type** Package

**Title** Refined Modified Stahel-Donoho Estimators for Outlier Detection

**Version** 0.1.0

**Suggests** testthat (>= 3.0.0)

**Description** A function for multivariate outlier detection named Modified Stahel-Donoho (MSD) estimators is contained. The function is for elliptically distributed datasets and recognizes outliers based on Mahalanobis distance.

The function is called the single core version in Wada & Tsubaki (2013) <[doi:10.1109/CLOUDCOM-ASIA.2013.86](https://doi.org/10.1109/CLOUDCOM-ASIA.2013.86)> and evaluated with other methods in Wada, Kawano & Tsubaki (2020) <[doi:10.17713/ajs.v49i2.872](https://doi.org/10.17713/ajs.v49i2.872)>.

**License** GPL (>= 3)

**Encoding** UTF-8

**Language** en-US

**RoxygenNote** 7.2.1

**Config/testthat/edition** 3

**NeedsCompilation** no

**Author** Kazumi Wada [aut, cre] (<<https://orcid.org/0000-0002-9578-1588>>)

**Maintainer** Kazumi Wada <kazwd2008@gmail.com>

**Repository** CRAN

**Date/Publication** 2023-11-06 18:10:02 UTC

## Contents

RMSD . . . . .	2
<b>Index</b>	<b>3</b>

---

RMSD

*Modified Stahel-Donoho Estimators (Single core version)*

---

### Description

This function is for multivariate outlier detection. Ver.1.6 2009/07/14 Published at <http://www.stat.go.jp/training/2kenkyu/pdf> (in Japanese) Ver.1.7 2018/10/19 Modify gso function to stop warning messages Ver.2 2021/09/10 Added the outlier detection step

### Usage

```
RMSD(inp, nb = 0, sd = 0, pt = 0.999)
```

### Arguments

inp	input data (a numeric matrix)
nb	number of basis
sd	seed (for reproducibility)
pt	threshold for outlier detection (probability)

### Value

a list of the following information

- u final mean vector
- V final covariance matrix
- wt final weights
- mah squared Mahalanobis distance of each observation
- FF F test statistics
- cf threshold to detect outliers (percentile point)
- ot outlier flag (1:normal observation, 2:outlier)

# Index

RMSD, [2](#)