# Package 'RMSDp'

November 16, 2023

**Type** Package

**Title** Refined Modified Stahel-Donoho (MSD) Estimators for Outlier
Detection (Parallel Version)

**Version** 0.1.0

**Suggests** testthat (>= 3.0.0)

**Depends** stats

**Imports** parallel, doParallel, foreach

**Description** A parallel function for multivariate outlier detection named modified Stahel-Donoho esti-
mators is contained in this package. The function RMSDp() is for elliptically dis-
tributed datasets and recognizes outliers based on Mahalanobis distance. This func-
tion is for higher dimensional datasets that cannot be handled by a single core func-
tion RMSD() included in 'RMSD' package. See Wada and Tsub-
aki (2013) <doi:10.1109/CLOUDCOM-ASIA.2013.86> for the detail of the algorithm.

**License** GPL (>= 3)

**Encoding** UTF-8

**Language** en-US

**RoxygenNote** 7.2.3

**Config/testthat/edition** 3

**NeedsCompilation** no

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**Repository** CRAN

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## R topics documented:

RMSDp            *Modified Stahel-Donoho Estimators (parallel version)*

### Description

This function is for multivariate outlier detection. version 0.0.1 2013/06/15 Related paper: DOI: 10.1109/CLOUDCOM-ASIA.2013.86 version 0.0.2 2021/11/15 Outlier detection step added version 0.0.3 2022/08/12 Bug fixed about Random seed setting

### Usage

```
RMSDp(inp, cores = 0, nb = 0, sd = 0, pt = 0.999, dv = 10000)
```

### Arguments

| | |
|---|---|
| inp | input data (a numeric matrix) |
| cores | number of cores used for this function |
| nb | number of basis |
| sd | seed (for reproducibility) |
| pt | threshold for outlier detection (probability) |
| dv | maximum number of elements processed together on the same core |

### Value

a list of the following information

- u final mean vector
- V final covariance matrix
- wt final weights
- mah squared squared Mahalanobis distances
- cf threshold to detect outlier (percentile point)
- ot outlier flag (1:normal observation, 2:outlier)

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