

Package: svmf (via r-universe)

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Type Package

Title The Scaled von Mises-Fisher Distribution

Version 1.0

Date 2026-06-11

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Depends R (>= 4.0)

Imports Rfast, stats

Description Functions to perform maximum likelihood estimation of and random value simulation from the scaled von Mises-Fisher distribution. The distribution is elliptical symmetric and can be applied to spherical and hyper-spherical data. The reference paper is Scealy J.L. and Wood A.T.A. (2019), <doi:10.1080/01621459.2019.1585249>.

License GPL (>= 2)

NeedsCompilation no

Repository <https://cran.r-universe.dev>

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Contents

svmf-package	2
rsvmf	2
svmf.mle	3

Index	5
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svmf-package

The Scaled von Mises–Fisher Distribution

Description

Functions to perform maximum likelihood estimation of and random value simulation from the scaled von Mises–Fisher distribution. For more information see Scealy and Wood (2019).

Details

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Type: Package
Version: 1.0
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Maintainers

Michail Tsagris <mtsagris@uoc.gr>.

Author(s)

Michail Tsagris <mtsagris@uoc.gr>

References

Scealy J.L. and Wood A.T.A. (2019). Scaled von Mises-Fisher distributions and regression models for paleomagnetic directional data. *Journal of the American Statistical Association*, 114(528): 1547–1560.

rsvmf

Random value simulation from the scaled von Mises–Fisher distribution

Description

Random value simulation from the scaled von Mises–Fisher distribution.

Usage

```
rsvmf(n, mu, a, kappa, Gamma = NULL)
```

Arguments

n	The sample size.
mu	The mean direction.
a	The vector of alphas.
kappa	The concentration parameter.
Gamma	The matrix with the γ vectors.

Value

A matrix with the simulated data.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

References

Scealy J.L. and Wood A.T.A. (2019). Scaled von Mises-Fisher distributions and regression models for paleomagnetic directional data. *Journal of the American Statistical Association*, 114(528): 1547–1560.

See Also

[svmf.mle](#)

Examples

```
mu <- rnorm(3)
mu <- mu / sqrt( sum(mu^2) )
a <- c(1, 3, 1/3)
y <- rsvmf(1000, mu, a, 20)
svmf.mle(y)
```

svmf.mle

Maximum likelihood estimation of the scaled von Mises–Fisher distribution

Description

Maximum likelihood estimation of the scaled von Mises–Fisher distribution.

Usage

```
svmf.mle(y, a1 = 1, maxit_outer = 100, maxit_V = 500, tol = 1e-6)
```

Arguments

<code>y</code>	A numerical matrix with the (hyper-)spherical observations.
<code>a1</code>	The value of the α_1 parameter is set to 1, as suggested by Scealy and Wood (2019).
<code>maxit_outer</code>	The maximum number of iterations to perform.
<code>maxit_V</code>	The maximum number of iterations to perform to estimate the V matrix.
<code>tol</code>	The tolerance value until convergence of the log-likelihood.

Value

A list including:

<code>mu</code>	The estimated mean direction.
<code>kappa</code>	The estimated concentration parameter.
<code>a</code>	The estimated vector of alphas, the first value is 1, by default.
<code>loglik</code>	the log-likelihood value.
<code>Gamma</code>	The estimated matrix with the γ vectors. The first column of this matrix is the mean direction.

Author(s)

Michail Tsagris.

R implementation and documentation: Michail Tsagris <mtsagris@uoc.gr>.

References

Scealy J.L. and Wood A.T.A. (2019). Scaled von Mises-Fisher distributions and regression models for paleomagnetic directional data. *Journal of the American Statistical Association*, 114(528): 1547–1560.

See Also

[rsvmf](#)

Examples

```
mu <- rnorm(3)
mu <- mu / sqrt( sum(mu^2) )
a <- c(1, 3, 1/3)
y <- rsvmf(1000, mu, a, 20)
svmf.mle(y)
```

Index

rsvmf, [2](#), [4](#)

svmf-package, [2](#)

svmf.mle, [3](#), [3](#)