

# Package ‘stcov’

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**Type** Package

**Title** Stein's Covariance Estimator

**Version** 0.1.0

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**Description** Estimates a covariance matrix using Stein's isotonized covariance estimator, or a related estimator suggested by Haff.

**License** GPL (>= 2)

**Suggests** testthat

**RoxygenNote** 5.0.1

**NeedsCompilation** no

**Repository** CRAN

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haff_cov	<i>Stein/Haff's covariance estimator</i>
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**Description**

Stein/Haff's covariance estimator

**Usage**

```
haff_cov(S, n)
```

**Arguments**

S	Sample covariance matrix
n	Number of observations

**Value**

Estimated covariance matrix

**References**

Haff, L. R. "The Variational Form of Certain Bayes Estimators." *The Annals of Statistics* 19, no. 3 (1991): 1163-1190.

Lin, S.P. and Perlman, M.D.. "A Monte Carlo comparison of four estimators of a covariance matrix." *Multivariate Analysis* 6 (1985): 411-429.

Stein, C. "Estimation of a covariance matrix". *Rietz Lecture* (1975).

**Examples**

```
p <- 5
n <- 10
S <- rWishart(1, n, diag(p))[, , 1]
haff_cov(S, n)
```

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haff_eig	<i>Stein/Haff's ordered eigenvalue estimates</i>
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**Description**

Stein/Haff's ordered eigenvalue estimates

**Usage**

```
haff_eig(l, n)
```

**Arguments**

l                    Sample eigenvalues  
n                    Number of observations

**Value**

Estimated eigenvalues

**Examples**

```
p <- 5  
n <- 10  
S <- rWishart(1, n, diag(p))[, ,1]  
l <- eigen(S)$val  
haff_eig(l, n)
```

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iso\_cov

*Stein's isotonized covariance estimator*

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**Description**

Stein's isotonized covariance estimator

**Usage**

```
iso_cov(S, n)
```

**Arguments**

S                    Sample covariance matrix  
n                    Number of observations

**Value**

Estimated covariance matrix

**Examples**

```
p <- 5  
n <- 10  
S <- rWishart(1, n, diag(p))[, ,1]  
iso_cov(S, n)
```

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iso_eig	<i>Stein's isotonized eigenvalue estimates</i>
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**Description**

Stein's isotonized eigenvalue estimates

**Usage**

```
iso_eig(l, n)
```

**Arguments**

l	Sample eigenvalues
n	Number of observations

**Value**

Estimated eigenvalues

**Examples**

```
p <- 5
n <- 10
S <- rWishart(1, n, diag(p))[, , 1]
l <- eigen(S)$val
iso_eig(l, n)
```

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stein_eig	<i>Stein's raw (unisotonized) eigenvalue estimates</i>
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**Description**

Stein's raw (unisotonized) eigenvalue estimates

**Usage**

```
stein_eig(l, n)
```

**Arguments**

l	Sample eigenvalues
n	Number of observations

**Value**

Estimated eigenvalues

**Examples**

```
p <- 5
n <- 10
S <- rWishart(1, n, diag(p))[, , 1]
l <- eigen(S)$val
stein_eig(l, n)
```

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