

# Package ‘bahc’

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**Type** Package

**Title** Filter Covariance and Correlation Matrices with  
Bootstrapped-Averaged Hierarchical Ansatz

**Version** 0.3.0

**Date** 2020-09-21

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**Description** A method to filter correlation and covariance matrices by averaging  
bootstrapped filtered hierarchical clustering and boosting. See Ch. Bongiorno and D. Challet,  
Covariance matrix filtering with bootstrapped hierar-  
chies (2020) <[doi:10.48550/arXiv.2003.05807](https://doi.org/10.48550/arXiv.2003.05807)> and  
Ch. Bongiorno and D. Challet, Reactive Global Minimum Variance Portfolios with k-  
BAHC covariance cleaning  
(2020) <[doi:10.48550/arXiv.2005.08703](https://doi.org/10.48550/arXiv.2005.08703)>.

**License** GPL

**Depends** R (>= 3.5.0), fastcluster, matrixStats

**Encoding** UTF-8

**LazyData** true

**RoxygenNote** 7.1.0

**NeedsCompilation** no

**Repository** CRAN

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|-------------------|---------------------------------------------|
| filterCorrelation | <i>Compute the BAHC correlation matrix.</i> |
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**Description**

Compute the BAHC correlation matrix.

**Usage**

```
filterCorrelation(x, k = 1, Nboot = 100)
```

**Arguments**

|       |                                                      |
|-------|------------------------------------------------------|
| x     | A matrix: $x_{i,f}$ is feature $f$ of object $i$     |
| k     | The order of filtering. $k = 1$ corresponds to BAHC. |
| Nboot | The number of bootstrap copies                       |

**Value**

The BAHC-filtered correlation matrix of x.

**Examples**

```
r=matrix(rnorm(1000),nrow=20) # 20 objects, 50 features each
Cor_bahc=filterCorrelation(r)
```

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|                  |                                            |
|------------------|--------------------------------------------|
| filterCovariance | <i>Compute the BAHC covariance matrix.</i> |
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**Description**

Compute the BAHC covariance matrix.

**Usage**

```
filterCovariance(x, k = 1, Nboot = 100)
```

**Arguments**

|       |                                                      |
|-------|------------------------------------------------------|
| x     | A matrix: $x_{i,f}$ is feature $f$ of object $i$     |
| k     | The order of filtering. $k = 1$ corresponds to BAHC. |
| Nboot | The number of bootstrap copies                       |

**Value**

The BAHC-filtered correlation matrix of x.

**Examples**

```
r=matrix(rnorm(1000),nrow=20) # 20 objects, 50 features each
sigma=exp(runif(20))
rs=t(sigma %*% r) %*% sigma
Cov_bahc=filterCovariance(rs)
```

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