Package 'sddpack'

February 20, 2015

Type Package

Title Semidiscrete Decomposition

Version 0.9

Date 2009-06-12

Author Tamara G. Kolda, Dianne P. O'Leary

Maintainer Eric Sun <esun@cs.stanford.edu>

Description The semidiscrete decomposition (SDD) approximates a matrix as a weighted sum of outer products formed by vectors with entries constrained to be in the set {-1, 0, 1}.

License GPL-2

LazyLoad yes

Repository CRAN

Date/Publication 2012-10-29 08:59:39

NeedsCompilation no

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`sddpack-package` *Semidiscrete Decomposition*

Description

The semidiscrete decomposition (SDD) approximates a matrix as a weighted sum of outer products formed by vectors with entries constrained to be in the set {-1, 0, 1}.

Details

Package:	sddpack
Type:	Package
Version:	1.0
Date:	2009-06-12
License:	GPL v2
LazyLoad:	yes

Author(s)

Tamara G. Kolda, Dianne P. O'Leary (Matlab code) Eric Sun <esun@cs.stanford.edu> (Ported to R)

References

http://www.cs.umd.edu/~oleary/SDDPACK/#authors

Examples

```
A = matrix(rnorm(100), nrow=10)
sdd(A)
```

---

sdd *Semidiscrete Decomposition*

Description

The semidiscrete decomposition (SDD) approximates a matrix as a weighted sum of outer products formed by vectors with entries constrained to be in the set {-1, 0, 1}.

Usage

```
sdd(A, kmax = 100, alphamin = 0.01, lmax = 100, rhomin = 10e-20)
```

Arguments

A	matrix of values on which to run sdd
kmax	number of outer-loop iterations (see References)
alphamin	progress check (see References)
lmax	number of inner-loop iterations (see References)
rhomin	threshold test (See References)

Details

The semidiscrete decomposition (SDD) approximates a matrix as a weighted sum of outer products formed by vectors with entries constrained to be in the set {-1, 0, 1}.

It is useful for image compression and for latent semantic indexing (LSI) in information retrieval.

The primary advantage of the SDD over other types of matrix approximations such as the truncated singular value decomposition (SVD) is that it typically provides a more accurate approximation for far less storage.

The package has been ported from Matlab code given on `http://www.cs.umd.edu/~oleary/SDDPACK/`. See the webpage for full documentation.

Value

`x`	matrix of `X`'s, where `A` is approximately equal to `X%*%diag(D)%*%Y`
`d`	vector of `D`'s, where `A` is approximately equal to `X%*%diag(D)%*%Y`
`y`	matrix of `Y`'s, where `A` is approximately equal to `X%*%diag(D)%*%Y`

Note

Ported to R by Eric Sun <esun@cs.stanford.edu>

Author(s)

Tamara G. Kolda, Dianne P. O'Leary (Matlab code)

References

http://www.cs.umd.edu/~oleary/SDDPACK/

Examples

```
A = matrix(rnorm(100), nrow=10)
sdd(A)
```

`sddsolve` *Helper function for sdd*

Description

Helper function for sdd. Not to be called directly.

Usage

```
sddsolve(s, m)
```

Arguments

s	matrix of values
m	number of rows

Details

Helper function for sdd. Not to be called directly.

Value

x

imax

fmax

Note

Not to be called directly.

Author(s)

Tamara G. Kolda, Dianne P. O'Leary

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