Package ‘irlba’

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Type  Package
Title  Fast partial SVD by implicitly-restarted Lanczos bidiagonalization
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Description A fast and memory-efficient method for computing a few approximate singular values and singular vectors of large matrices.
Depends R (>= 2.15.0)
Imports Matrix
License GPL
NeedsCompilation no
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R topics documented:

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  irlba  Find a few approximate singular values and singular vectors of a matrix.

Description

The augmented implicitly restarted Lanczos bi-diagonalization (IRLBA) algorithm finds a few approximate singular values and corresponding singular vectors of a matrix using a method of Baglama and Reichel. It is a fast and memory-efficient way to compute a partial SVD.
Usage

irlba(A, nu = 5, nv = 5, adjust = 3, aug = c("ritz","harm"),
   sigma = c("ls","ss"), maxit = 1000, m_b = 20, reorth = 2,
   tol = 1e-06, V = NULL, matmul = NULL)

Arguments

A       A double-precision real or complex matrix or real sparse matrix
nu      Number of desired left singular vectors
nv      Number of desired right singular vectors
adjust  Number of extra approximate singular values to compute to enhance conver-
         gence
aug     "ritz" for Ritz "harm" for harmonic Ritz vector augmentation
sigma   "ls" for largest few singular values, "ss" for smallest
maxit   Maximum number of iterations
m_b     Size of the projected bidiagonal matrix
reorth  Either 1 or 2: full (2) or one-sided (1) reorthogonalization
tol     Convergence is determined when ||A*V - U*S|| <= tol*||A||, where ||A|| is ap-
         proximated by the largest singular value of all projection matrices.
V       Optional matrix of approximate right singular vectors
matmul  Option matrix multiply function--if specified, matmul must be a function that
         takes three arguments: A, B, transpose and computes A %*% B if transpose=FALSE
         or t(A) %*% B if transpose=TRUE.

Details

The syntax of irlba largely conforms to svd, with an important exception. The usual R svd
function always returns a complete set of singular values, even if the number of singular vectors nu
or nv is set less than the maximum. The irlba function returns a number of singular values equal
to the maximum of the number of specified singular vectors nu and nv.

Value

d       max (nu, nv) approximate singular values
u       nu approximate left singular vectors
v       nv approximate right singular vectors
iter    The number of Lanczos iterations carried out
mprod   The total number of matrix vector products carried out

Author(s)

Adapted for R by B. W. Lewis <blewis@illposed.net>
References


Examples

```r
A <- matrix(runif(100*100),100,100)
S <- irlba(A)
S$d
```
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