# Package ‘cheb’

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**Type** Package  
**Title** Discrete Linear Chebyshev Approximation  
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**cheb-package**  
*Discrete Linear Chebyshev Approximation*

**Description**

R Interface to the CHEB code by Barrodale and Philips for Discrete Linear Chebyshev Approximation. Computes the Chebyshev solution to an overdetermined system of linear equations.
Details

The package contains a single function `chebR`, which takes as its arguments a matrix of predictors and a vector of outcomes.

Author(s)

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References


Examples

```r
a<-matrix(rnorm(20),10,2)
b<-rnorm(10)
chebR(a,b)
```

Description

Discrete Linear Chebyshev Approximation

Usage

`chebR(a, b, tol = 1e-15, relerr = 0)`

Arguments

- `a`: matrix with left-hand sides
- `b`: vector with right-hand sides
- `tol`: a small positive tolerance
- `relerr`: relative error
Details

R Interface to the CHEB code by Barrodale and Philips for Discrete Linear Chebyshev Approximation. Computes the Chebyshev solution to an overdetermined system of linear equations.

relerr is a real variable which on entry must have the value 0.0 if a Chebyshev solution is required. If relerr is positive, the subroutine calculates an approximate solution with relerr as an upper bound on the relative error of its largest residual.

Value

A list with the following components:

- coefs: regression coefficients
- resids: signed residuals
- rank: rank of coefficient matrix
- iter: number of simplex iterations performed
- ocode: error code: ocode=0 for a probably non-unique solution, ocode=1 for a unique solution, ocode=2 for premature termination due to rounding errors

Author(s)

Jan de Leeuw

References


Examples

```r
a <- matrix(rnorm(20), 10, 2)
b <- rnorm(10)
chebR(a, b)
## the function is currently defined as
function(a, b, tol=1e-15, relerr=0.0) {
m <- nrow(a); n <- ncol(a); ndim <- n+3; mdim <- m+1
if (n > m) stop("number of equations exceeds number of unknowns")
aa <- matrix(0, ndim, mdim); bb <- rep(0, mdim); xx <- rep(0, ndim)
aa[1:n,1:m] <- t(a); bb[1:m] <- b
rlist <- .Fortran("cheb", as.integer(m), as.integer(n), as.integer(m+1), as.integer(n+3),
as.single(aa), bb=as.single(bb), as.single(tol), as.single(relerr), xx=as.single(xx),
rank=as.integer(0), resmax=as.single(0.0), iter=as.integer(0), ocode=as.integer(0))
return(list(coefs=rlist$xx[1:n], resids=rlist$bb[1:m], rank=rlist$rank, iter=rlist$iter, ocode=rlist$ocode))
}
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