# Package 'cheb'

July 2, 2014

**Type** Package

**Title** Discrete Linear Chebyshev Approximation

**Version** 0.3

**Date** 2008-02-19

**Author** Jan de Leeuw <deleeuw@stat.ucla.edu>

**Maintainer** Jan de Leeuw <deleeuw@stat.ucla.edu>

**Description** Discrete Linear Chebyshev Approximation

**License** GPL-3

**Encoding** UTF-8

**Repository** CRAN

**Date/Publication** 2013-02-22 08:50:40

**NeedsCompilation** yes

## R topics documented:



---

`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

| | |
|---|---|
| Package: | cheb |
| Type: | Package |
| Version: | 0.2 |
| Date: | 2008-02-19 |
| License: | GPL-3 |

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

## Author(s)

Jan de Leeuw

Maintainer: Jan de Leeuw <deleeuw@stat.ucla.edu>

## References

I. Barrodale and C. Philips. Algorithm 495 – Solutions of an Overdetermined System of Linear Equations in the Chebyshev Norm. ACM Transactions on Mathematical Software, 1:264–270, 1975.

## Examples

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

---

chebR *chebR*

---

## 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

I. Barrodale and C. Philips. Algorithm 495 – Solutions of an Overdetermined System of Linear Equations in the Chebyshev Norm. ACM Transactions on Mathematical Software, 1:264–270, 1975.d

## Examples

```
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))
  }
```

# Index