Package 'ABCoptim'

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Type Package

Title Implementation of Artificial Bee Colony (ABC) Optimization

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Description An implementation of Karaboga (2005) Artificial Bee Colony Optimization algorithm. This (working) version is a Work-in-progress, which is why it has been implemented using pure R code. This was developed upon the basic version programmed in C and distributed at the algorithm's official website.

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URL http://github.com/gvegayon/ABCoptim, http://mf.erciyes.edu.tr/abc/

License GPL (>= 3)

LazyLoad yes

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R topics documented:

ABCoptim-package *An implementation of the Artificial Bee Colony (ABC) Algorithm*

Description

This is an implementation of Karaboga (2005) ABC optimization algorithm. It was developed upon the basic version programmed in C and distributed at the algorithm's official website (see the references).

Please consider that this version is in alpha state of development, thus any evident (precision) error should be blaimed to the package author (not to the algorithm itself)

Please visit the project home for more information: https://github.com/gvegayon/ABCoptim.

Details

Package:	ABCoptim
Type:	Package
Version:	0.13.10.24
Date:	2013-10-24
License:	GPL version 2 or later

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References

D. Karaboga, *An Idea based on Honey Bee Swarm for Numerical Optimization*, tech. report TR06,Erciyes University, Engineering Faculty, Computer Engineering Department, 2005 http://mf.erciyes.edu.tr/abc/pub/tr06_2005.pdf

Artificial Bee Colony (ABC) Algorithm (website) http://mf.erciyes.edu.tr/abc/index.htm

Basic version of the algorithm implemented in C (ABC's official website) http://mf.erciyes.edu.tr/abc/form.aspx

Examples

```
## Not run:
  demo(ABCoptim) # Some functions...

## End(Not run)
```

abc_optim *Optimization through ABC algorithm*

Description

Optimizes through the ABC algorithm

Usage

```
abc_optim(par, fn, D=length(par), ..., NP=40, FoodNumber = NP/2,
    lb=-Inf, ub=+Inf, limit=100, maxCycle=1000, optiinteger=FALSE,
    criter=50)
```

Arguments

par	Initial values for the parameters to be optimized over
fn	A function to be minimized, with first argument of the vector of parameters over which minimization is to take place. It should return a scalar result.
D	Number of parameters to be optimized.
...	Further arguments to be passed to 'fn'.
NP	Number of bees.
FoodNumber	Number of food sources to exploit.
lb	Lower bound of the parameters to be optimized.
ub	Upper bound of the parameters to be optimized.
limit	Limit of a food source.
maxCycle	Maximum number of iterations.
optiinteger	Whether to optimize binary parameters or not.
criter	Stop criteria (numer of unchanged results) until stopping

Details

This is an implementation of Karaboga (2005) ABC optimization algorithm. It was developed upon the basic version programmed in C and distributed at the algorithm's official website (see the references).

By default, lower and upper bounds are set as +-Inf. This last thing is just conceptual as all infinite bounds are replaced by .Machine$double.xmax*1e-10 (still a pretty big number).

If D (the number of parameters to be optimzed) is greater than one, then lb and ub can be either scalars (assuming that all the parameters share the same boundaries) or vectors (the parameters have different boundaries each other).

Value

A list containing the optimized parameters ($par), the value of the function ($value) and the number of iterations taken to reach the optimum ($counts).

Author(s)

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References

D. Karaboga, *An Idea based on Honey Bee Swarm for Numerical Optimization*, tech. report TR06,Erciyes University, Engineering Faculty, Computer Engineering Department, 2005 http://mf.erciyes.edu.tr/abc/pub/tr06_2005.pdf

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Examples

```
# EXAMPLE 1: The minimum is at (pi,pi)
fun <- function(x) {
  -cos(x[1])*cos(x[2])*exp(-((x[1] - pi)^2 + (x[2] - pi)^2))
}

abc_optim(rep(0,2), fun, lb=-20, ub=20, criter=100)

# EXAMPLE 2: global minimum at about (-15.81515)
fw <- function (x)
  10*sin(0.3*x)*sin(1.3*x^2) + 0.00001*x^4 + 0.2*x+80

abc_optim(50, fw, lb=-100, ub=100, criter=100)

# EXAMPLE 3: 5D sphere, global minimum at about (0,0,0,0,0)
fs <- function(x) sum(x^2)

abc_optim(rep(10,5), fs, lb=-100, ub=100, criter=200)
```

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