Package 'psoptim'

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Title Particle Swarm Optimization

Depends R (>= 2.0.0)

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Description Particle swarm optimization - a basic variant.

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NeedsCompilation no

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R topics documented:

`psoptim` *Particle Swarm OPTIMization*

Description

Particle swarm optimization. The maximum is searched.

Usage

```
psoptim(FUN, n=100, max.loop=100, w=0.9, c1=0.2, c2=0.2,
        xmin, xmax, vmax=c(4,4), seed=10, anim=TRUE)
```

Arguments

FUN	the optimized function with a vector as parameter
n	number of particles
max.loop	maximal number of iterations
w	inertia weight
c1	coefficient of the self-recognition component
c2	coefficient of the social component
xmin	vector of position constraints - minimal values
xmax	vector of position constraints - maximal values
vmax	vector of velocity constraints in each direction
seed	seed for random values
anim	logical; if TRUE (dafault), animation of the optimization process is shown

Details

The i-th particle velocity v in j-th direction is calculated in t iteration according to:

v[ij](t+1) = w*v[ij](t) + c1*r1*(xP[ij](t) - x[ij](t)) + c2*r2*(xS[j](t) - x[ij](t)).

where: r1 and r2 are random values, w is inertia weight, c1 is a coefficient of the self-recognition component and c2 is a coefficient of the social component. xP denotes so far best position of the particle and xS - the best position among the swarm.

The new position (coordinates) is calculated as:

x[ij](t+1) = x[ij](t) + v[ij](t+1). In the current version of the package, the function works without checking the correctness of the given arguments.

Value

A list with the two components:

sol solution, i.e. the best set of parameters found.

val the best fitness function found.

Author(s)

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References

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Banks A, Vincent J, Anyakoha C. (2007) *A review of particle swarm optimization. Part I: background and development*. Natural Computing, vol. 6, No. 4, pp. 467-484.

Dorigo M, Stutzle T. (2004) *Ant Colony Optimization*, MIT Press.

Eberhart R, Yuhui S. (2001) *Particle swarm optimization: developments, applications and resources*, Congress on Evolutionary Computation. Seoul, Korea.

Examples

```
n <- 50
m.l <- 50
w <- 0.95
c1 <- 0.2
c2 <- 0.2
xmin <- c(-5.12, -5.12)
xmax <- c(5.12, 5.12)
vmax <- c(4, 4)

g <- function(x){
  -(20 + x[,1]^2 + x[,2]^2 - 10*(cos(2*pi*x[,1]) + cos(2*pi*x[,2])))
}

psoptim(FUN=g, n=n, max.loop=m.l, w=w, c1=c1, c2=c2,
        xmin=xmin, xmax=xmax, vmax=vmax, seed=5, anim=FALSE)
```

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