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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R topics documented:

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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 (default), 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


Examples

n <- 50
m.1 <- 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.1, w=w, c1=c1, c2=c2, 
xmin=xmin, xmax=xmax, vmax=vmax, seed=5, anim=FALSE)
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