

Package ‘ROI.plugin.deoptim’

October 23, 2017

Version 0.3-0

Title 'DEoptim' and 'DEoptimR' Plugin for the 'R' Optimization Interface

Author Florian Schwendinger [aut, cre]

Maintainer Florian Schwendinger <FlorianSchwendinger@gmx.at>

Description Enhances the R Optimization Infrastructure ('ROI') package with the 'DEoptim' and 'DEoptimR' package. 'DEoptim' is used for unconstrained optimization and 'DEoptimR' for constrained optimization.

Imports methods, stats, utils, ROI (>= 0.3-0), DEoptim, DEoptimR (>= 1.0-4)

License GPL-3

URL <http://R-Forge.R-project.org/projects/roi>

NeedsCompilation no

Repository CRAN

Date/Publication 2017-10-23 11:05:08 UTC

R topics documented:

Example-1	2
Example-2	2
Example-3	3
Index	5

 Example-1

Banana

Description

The following example is also known as Rosenbrock's banana function (https://en.wikipedia.org/wiki/Rosenbrock_function).

$$\text{minimize } f(x) = 100(x_2 - x_1^2)^2 + (1 - x_1)^2$$

Solution: c(1, 1)

Examples

```
library(ROI)

f <- function(x) {
  return( 100 * (x[2] - x[1]^2)^2 + (1 - x[1])^2 )
}

x <- OP( objective = F_objective(f, n=2L, names=c("x_1", "x_2")),
        bounds = V_bound(li=1:2, ui=1:2, lb=c(-3, -3), ub=c(3, 3)) )

nlp <- ROI_solve(x, solver="deoptim")
nlp
## Optimal solution found.
## The objective value is: 3.828383e-22
solution(nlp)
## x_1 x_2
## 1 1
```

 Example-2

Hock-Schittkowski-Collection Problem 16

Description

The following example solves problem 16 from the Hock-Schittkowski-Collection (http://www.ai7.uni-bayreuth.de/test_problem_coll.pdf).

$$\text{minimize } f(x) = 100(x_2 - x_1^2)^2 + (1 - x_1)^2$$

$$\text{subject to: } x_1 + x_2^2 \geq 0 \quad x_1^2 + x_2 \geq 0$$

$$-2 \geq x_1 \geq 0.5 \quad x_2 \geq 1$$

Solution: c(0.5, 0.25)

Examples

```

library(ROI)

f <- function(x) {
  return( 100 * (x[2] - x[1]^2)^2 + (1 - x[1])^2 )
}

f.gradient <- function(x) {
  return( c( -400 * x[1] * (x[2] - x[1] * x[1]) - 2 * (1 - x[1]),
            200 * (x[2] - x[1] * x[1])) )
}

x <- OP( objective = F_objective(f, n=2L, G=f.gradient),
        constraints = c(F_constraint(F=function(x) x[1] + x[2]^2, ">=", 0,
                                   J=function(x) c(1, 2*x[2])),
                       F_constraint(F=function(x) x[1]^2 + x[2], ">=", 0,
                                   J=function(x) c(2*x[1], x[2]))),
        bounds = V_bound(li=1:2, ui=1:2, lb=c(-2, -Inf), ub=c(0.5, 1)) )

nlp <- ROI_solve(x, solver="alabama", start=c(-2, 1))
nlp
## Optimal solution found.
## The objective value is: 2.499999e-01
solution(nlp)
## [1] 0.5000001 0.2499994

```

Example-3

Hock-Schittkowski-Collection Problem 36

Description

The following example solves example 36 from the Hock - Schittkowski models (<http://apmonitor.com/wiki/index.php/Apps/HockSchittkowski>).

$$\text{minimize } -x_1x_2x_3$$

$$\text{subject to: } x_1 + 2x_2 + x_3 \leq 72$$

$$0 \leq x_1 \leq 20, 0 \leq x_2 \leq 11, 0 \leq x_3 \leq 42$$

Examples

```

library(ROI)

hs036_obj <- function(x) {
  -x[1] * x[2] * x[3]
}

hs036_con <- function(x) {

```

```
    x[1] + 2 * x[2] + 2 * x[3]
  }

x <- OP( objective = F_objective(hs036_obj, n = 3L),
        constraints = F_constraint(hs036_con, "<=", 72),
        bounds = V_bound(ub = c(20, 11, 42)) )

nlp <- ROI_solve(x, solver = "deoptim", start = c(10, 10, 10))
nlp
## Optimal solution found.
## The objective value is: -3.300000e+03
solution(nlp, "objval")
## [1] -3300
solution(nlp)
## [1] 20 11 15
```

Index

Example-1, 2

Example-2, 2

Example-3, 3