Package 'ROI.plugin.scs'

October 31, 2026

Version 1.1-4

Title 'SCS' Plug-in for the 'R' Optimization Infrastructure

Description Enhances the 'R' Optimization Infrastructure ('ROI') package with the 'SCS' solver for solving convex cone problems.

Imports stats, methods, slam, ROI (>= 1.0-0), scs (>= 3.2-4)

Suggests tinytest

License GPL-3

URL https://gitlab.com/roigrp/solver/ROI.plugin.scs

BugReports https://gitlab.com/roigrp/solver/ROI.plugin.scs/-/work_items

NeedsCompilation no

Author Florian Schwendinger [aut, cre]

Maintainer Florian Schwendinger <FlorianSchwendinger@gmx.at>

Repository CRAN

Date/Publication 2026-10-31 08:20:49 UTC

Contents

Example-1 2
Example-2 2
Example-3 3

Index **5**

Example-1 *SOCP 1*

Description

$$maximize \;\; x + y$$
$$subject\ to \;\; x^2 + y^2 \leq 1$$
$$x \geq 0, y \geq 0$$

Examples

```
Sys.setenv("ROI_LOAD_PLUGINS" = FALSE)
library(ROI)
library(ROI.plugin.scs)

obj <- L_objective(c(1, 1))
## NOTE: chol(diag(2)) == diag(2)
con <- C_constraint(L = rbind(0, -diag(2)), cones = K_soc(3), rhs = c(1, 0, 0))
op <- OP(obj, con, maximum = TRUE)
x <- ROI_solve(op, solver = "scs")
x
## Optimal solution found.
## The objective value is: 1.414214e+00
solution(x)
## [1] 0.7071068 0.7071068
```

Example-2 *SOCP 2*

Description

The following example is also known as Problem 10 from the Hock-Schittkowski-Collection Hock and Schittkowski (1981).

$$minimize \;\; x - y$$
$$subject\ to \;\; -3x^2 + 2xy + 1 \geq 0$$

References

W. Hock, K. Schittkowski (1981): Test Examples for Nonlinear Programming Codes, Lecture Notes in Economics and Mathematical Systems, Vol. 187, Springer

Examples

```
Sys.setenv("ROI_LOAD_PLUGINS" = FALSE)
library(ROI)
library(ROI.plugin.scs)

obj <- L_objective(c(1, -1))
L <- chol(rbind(c(3, -1), c(-1, 1)))
con <- C_constraint(L = rbind(0, -L), cones = K_soc(3), rhs = c(1, 0, 0))
op <- OP(objective = obj, constraints = con,
         bounds = V_bound(li = 1:2, lb = rep(-Inf, 2)))
x <- ROI_solve(op, solver="scs")
x
## Optimal solution found.
## The objective value is: -1.000000e+00
solution(x)
## [1] 1.996387e-10 1.000000e+00
```

Example-3 *SOCP 3*

Description

The following example is originally from the CVXOPT (https://cvxopt.org/userguide/coneprog.html) homepage.

$$minimize \quad -2x_1 + x_2 + 5x_3$$

subject to

$$\left\| \begin{array}{c} -13x_1 + 3x_2 + 5x_3 - 3 \\ -12x_1 + 12x_2 - 6x_3 - 2 \end{array} \right\|_2 \leq -12x_1 - 6x_2 + 5x_3 - 12$$

$$\left\| \begin{array}{c} -3x_1 + 6x_2 + 2x_3 \\ x_1 + 9x_2 + 2x_3 + 3 \\ -x_1 - 19x_2 + 3x_3 - 42 \end{array} \right\|_2 \leq -3x_1 + 6x_2 - 10x_3 + 27$$

References

Andersen, Martin S and Dahl, Joachim and Vandenberghe, Lieven (2016) CVXOPT: A Python package for convex optimization, version 1.1.8, https://cvxopt.org/

Examples

```
Sys.setenv("ROI_LOAD_PLUGINS" = FALSE)
library(ROI)
library(ROI.plugin.scs)

lo <- L_objective(c(-2, 1, 5))
lc1 <- rbind(c(12, 6, -5), c(13, -3, -5), c(12, -12, 6))
lc2 <- rbind(c(3, -6, 10), c(3, -6, -2), c(-1, -9, -2), c(1, 19, -3))
```

```
lc <- C_constraint(L = rbind(lc1, lc2),
                   cones = K_soc(c(3, 4)),
                   rhs = c(c(-12, -3, -2), c(27, 0, 3, -42)))
vb <- V_bound(li = 1:3, lb = rep(-Inf, 3))
op <- OP(objective = lo, constraints = lc, bounds = vb)
x <- ROI_solve(op, solver="scs")
x
## Optimal solution found.
## The objective value is: -3.834637e+01
solution(x)
## [1] -5.014767 -5.766924 -8.521796
```

Index

Example-1, 2
Example-2, 2
Example-3, 3