

# Package ‘ROI.plugin.qpoases’

August 29, 2020

**Version** 1.0-0

**Title** 'qpOASES' Plugin for the 'R' Optimization Infrastructure

**Description** Enhances the 'R' Optimization Infrastructure ('ROI') package with the quadratic solver 'qpOASES'. More information about 'qpOASES' can be found at <<https://projects.coin-or.org/qpOASES/>>.

**Imports** methods, slam, ROI (>= 0.2-5), Rcpp (>= 0.12.11), checkmate

**License** GPL-3

**LinkingTo** Rcpp

**URL** <http://roi.r-forge.r-project.org/>,  
<https://r-forge.r-project.org/projects/roi/>

**NeedsCompilation** yes

**Author** Florian Schwendinger [aut, cre],  
Hans Joachim Ferreau [cph],  
Andreas Potschka [cph],  
Christian Kirches [cph],  
Dennis Janka [cph],  
Andreas Waechter [cph]

**Maintainer** Florian Schwendinger <[FlorianSchwendinger@gmx.at](mailto:FlorianSchwendinger@gmx.at)>

**Repository** CRAN

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ROI.plugin.qpoases-package  
*qpOASES*

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### Description

This package provides an interface to qpOASES. pOASES is an open-source C++ implementation of the online active set strategy, which was inspired by important observations from the field of parametric quadratic programming (QP).

### References

H.J. Ferreau and C. Kirches and A. Potschka and H.G. Bock and M. Diehl. qpOASES: A parametric active-set algorithm for quadratic programming, “Mathematical Programming Computation”, 2014

H.J. Ferreau and H.G. Bock and M. Diehl. An online active set strategy to overcome the limitations of explicit MPC, “International Journal of Robust and Nonlinear Control”, 2008

H.J. Ferreau and A. Potschka and C. Kirches. qpOASES “webpage” <https://projects.coin-or.org/qpOASES>, 2017

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Example-1

*Quadratic Problem 1*

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### Description

$$\text{maximize } x_1^2 + x_2^2 + x_3^2 - 5x_2$$

*subject to :*

$$-4x_1 - 3x_2 + \geq -8$$

$$2x_1 + x_2 + \geq 2$$

$$-2x_2 + x_3 \geq 0$$

$$x_1, x_2, x_3 \geq 0$$

### Examples

```
require("ROI")
A <- cbind(c(-4, -3, 0),
           c( 2,  1, 0),
           c( 0, -2, 1))
x <- OP(Q_objective(diag(3), L = c(0, -5, 0)),
        L_constraint(L = t(A),
                     dir = rep(">=", 3),
                     rhs = c(-8, 2, 0)))
```

```
opt <- ROI_solve(x, solver="qpoases")
opt
## Optimal solution found.
## The objective value is: -2.380952e+00
solution(opt)
## [1] 0.4761905 1.0476190 2.0952381
```

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