

Package ‘ROI.plugin.msbinlp’

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Version 1.0-1

Title 'Multi-Solution' Binary Linear Problem Plug-in for the 'R'
Optimization Interface

Description Enhances the 'R' Optimization Infrastructure ('ROI') package
with the possibility to obtain multiple solutions for linear
problems with binary variables. The main function is copied
(with small modifications) from the relations package.

Imports stats, methods, utils, slam, ROI (>= 1.0-0)

Suggests ROI.plugin.glpk

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URL <https://roigrp.gitlab.io>,
<https://gitlab.com/roigrp/solver/ROI.plugin.msbinlp>

NeedsCompilation no

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Example-1

*Multiple Solutions - Binary LP***Description**

$$\begin{aligned}
 & \text{maximize } x + y \\
 & \text{subject to } x + y = 1 \\
 & x, y \in \{0, 1\}
 \end{aligned}$$

Examples

```
## Not run:
library(ROI)
op <- OP(objective = c(1, 1),
         constraints = L_constraint(c(1, 1), "=", 1),
         types = c("B", "B"))

x <- ROI_solve(op, solver = "msbinlp", method = "glpk", nsol_max = 2L)
x
## 2 optimal solutions found.
## The objective value is: 1.000000e+00
solution(x)
## [[1]]
## [1] 1 0
##
## [[2]]
## [1] 0 1

## End(Not run)
```

Example-2

*Multiple Solutions - Binary LP***Description**

$$\begin{aligned}
 & \text{maximize } -x_1 - x_2 - x_3 - x_4 - 99x_5 \\
 & \text{subject to} \\
 & x_1 + x_2 \leq 1 \\
 & x_3 + x_4 \leq 1 \\
 & x_4 + x_5 \leq 1 \\
 & x_i \in \{0, 1\}
 \end{aligned}$$

References

Matteo Fischetti and Domenico Salvagnin (2010) *Pruning moves*. INFORMS Journal on Computing 22.1: 108-119.

Examples

```
## Not run:
library(ROI)
op <- OP()
objective(op) <- L_objective(c(-1, -1, -1, -1, -99))
mat <- simple_triplet_matrix(rep(1:3, 2),
                             c(c(1, 3, 4), c(2, 4, 5)),
                             rep(1, 6))
constraints(op) <- L_constraint(mat,
                                dir = leq(3),
                                rhs = rep.int(1, 3))
types(op) <- rep("B", length(op))

x <- ROI_solve(op, solver = "msbinlp", method = "glpk", nsol_max = 2L)
x
## 2 optimal solutions found.
## The objective value is: -1.010000e+02
solution(x)
## [[1]]
## [1] 0 1 1 0 1
##
## [[2]]
## [1] 1 0 1 0 1

## End(Not run)
```

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