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

$$maximize \;\; x + y$$
$$subject\ to \;\; x + y = 1$$
$$x, y \in \{0, 1\}$$

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

$$maximize \;\; -x_1 - x_2 - x_3 - x_4 - 99x_5$$
$$subject\ to$$
$$x_1 + x_2 \leq 1$$
$$x_3 + x_4 \leq 1$$
$$x_4 + x_5 \leq 1$$
$$x_i \in \{0, 1\}$$

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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