SCIENCESPRINGDAY

FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

Department Mathematics

Inconsistens Systems/Timetabling / Global OPT

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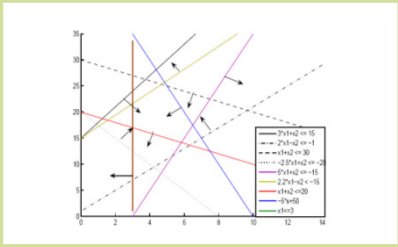
Objectives

Linear Inconsistent Systems - Find minimal changes in the coefficients of an inconsistent linear system that will render feasibility.

Timetabling – Develop automatic procedures do create examination timetabling.

Fractional Quadratic Problems – Find global optimization procedures.



Methodology

Linear Inconsistent Systems - By reformulating the problem it was possible to find a relaxation that gives good lower bounds. Together with the construction of upper bounds a branch and bound method was developed.

Timetabling - Using decision methods to control the tabu tenure in a Tabu Search, an automatic implementation of TS was achieved.

Fractional Quadratic Problems – An equivalent formulation based on completely positive conic optimization was constructed. Th relaxation of the completely positive cone permits to obtain good lower bounds.

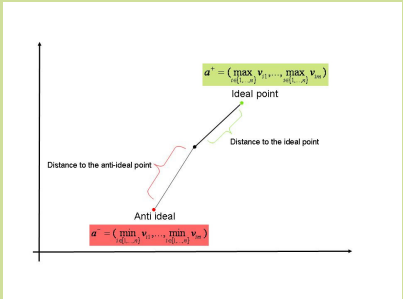
$$\psi = \min \underbrace{f(x) = \frac{x^\top Cx + 2c^\top x + \gamma}{x^\top Bx + 2b^\top x + \beta}}_{p(x)} : \underbrace{x \in \mathbb{R}^n_+ : Ax = a}_{\mathcal{T}}$$

Expected Results

In Future research:
Linear Inconsistent Systems - Similar study with bounds on the perturbation of the coefficients.

Timetabling – Increase the level of automatization of the procedures.

Fractional Quadratic Problems – Explore better conic approximations for the completely positive cone and to solve some implementation limitations related with the size of the problems.



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