

INVITATION TO THE LECTURE

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13:00

CONFERENCE ROOM

BARZILAI-BORWEIN RULES IN GRADIENT PROJECTION METHODS: A REDEFINITION FOR BOX-CONSTRAINED OPTIMIZATION PROBLEMS

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Starting from the pioneering paper by Barzilai and Borwein (1988), which opened the way to inexpensively accelerate first-order methods, in the last decades several efficient steplength techniques have been designed in order to make gradient descent methods more and more effective also for problems which handle large-scale data and require real-time solutions.

We analyse how, for quadratic programs, the spectral properties of the original Barzilai-Borwein (BB) schemes are affected by the presence of the constraints, starting from the special case of box constraints. Motivated by these evidences, we propose modified versions of the BB rules (and their extensions), obtaining improvements of the gradient projection methods. The practical effectiveness of the proposed strategies has been tested on random large scale box-constrained quadratic problems, on some well known non quadratic problems and on a set of test problems arising from real-life applications.