

# A second-order Augmented Lagrangian Method for box-constrained and general constrained optimization \*

Roberto ANDREANI<sup>1</sup>, Ernesto BIRGIN<sup>2</sup>, José Mario MARTINEZ<sup>1</sup>,  
María Laura SCHUVERDT<sup>3</sup>

<sup>1</sup> Universidade de Campinas, Brazil

<sup>2</sup> Universidade de San Pablo, Brazil

<sup>3</sup> Universidad Nacional de La Plata, Argentina

In this work we introduced a nonlinear Augmented Lagrangian algorithm that converges to second-order stationary points. The main tool is a second-order negative-curvature method for box-constrained minimization of a certain class of functions that do not possess continuous second derivatives. This new method is used to solve the subproblems of the Augmented Lagrangian algorithm. Convergence proofs under weak constraint qualifications are given. Numerical examples showing that the new method converges to second-order stationary points in situations in which first-order methods fail are exhibited.

\* This work was supported by PRONEX-Optimization (PRONEX - CNPq / FAPERJ E-26 / 171.164/2003 - APQ1) and FAPESP (Grants 06/53768-0 and 05-57684-2)