

# A Flexible Inexact Restoration Method and Multiobjective Application

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## Resumo

We introduce a new flexible Inexact-Restoration algorithm and an application for Multiobjective Constrained Optimization Problems under the weighted-sum scalarization approach. In Inexact-Restoration methods, each iteration has two phases. The first phase aims at improving feasibility and the second phase aims to minimize a suitable objective function. In the second phase we also impose bounded deterioration of the feasibility, obtained in the first phase. Here we combine the basic ideas of the Fischer-Friedlander approach for Inexact-Restoration with the use of approximations of the Lagrange multipliers. We present a new option to obtain a range of search directions in the optimization phase and we employ the sharp Lagrangian as merit function. Furthermore, we introduce a flexible way to handle sufficient decrease requirements and an efficient way to deal with the penalty parameter. We show that, with the Inexact-Restoration framework, there is a natural way to explore the structure of Multiobjective Constrained Optimization Problems in both Inexact-Restoration phases. Global convergence of the proposed Inexact-Restoration method is proved, and examples of the numerical behaviour of the algorithm are reported.