

A NONLINEAR PROGRAMMING ALGORITHM USING TRUST REGIONS AND A NON MONOTONE FILTER

MARÍA CRISTINA MACIEL

Departamento de Matemática, Universidad Nacional del Sur.

and

MARÍA de GRACIA MENDONÇA

*Departamento de Matemática, Facultad de Ingeniería,
Universidad Nacional de la Patagonia San Juan Bosco*

Abstract

This work presents a model algorithm based on the trust region approach for solving the nonlinear programming problem with equality and box constraints.

Only Lipschitz continuity on the gradients of the objective and constraints functions is required.

The trial step is characterized by mild conditions and non monotone behaviour of its normal and tangential components. These components are computed via the spectral projected gradient method proposed by Birgin, Martínez and Raydan in 2000.

The other main characteristic of the algorithm is that the step is evaluated by acceptance by using the notion of filter. The construction of the filter follows a non monotone strategy which can be considered as a generalization not only of the well known fraction of Cauchy reduction condition but also of the non monotone line search proposed by Grippo, Lampariello y Lucidi in 1986.

The properties of the step and the way that the filter is built allow to establish global convergence.

The algorithm is coded in FORTRAN and numerical results to show the behaviour of the algorithm are presented. These results indicate that the algorithm should cope quite well with large problems.