

CONSTRAINED OPTIMIZATION FOR THE RECONSTRUCTION OF WIND FIELDS  
IN METEOROLOGY

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ABSTRACT

Diagnostic models in meteorology generate a wind field satisfying some time-independent physical constraints. Among these models mass-consistent models play an important role, [1]. We study a variational method based on Sasaki's method [2], which provide an adjusted field by the minimization of a functional with a mass conservation constraint. Most of the authors have obtained this minimum solving an elliptic equation for the multiplier, but there is a controversy about the proper boundary conditions. Here we study the problem in two ways:

- 1) One by orthogonal projection in Hilbert spaces, which leads to the same elliptic problem, but with the natural boundary conditions for the multiplier.
- 2) A second approach from a saddle--point formulation of the problem, which can be solved by iterative conjugate gradient methods. This last methodology was inspired from R. Glowinski's approach to solve Stokes--like problems in CFD [3].

Bibliography

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