

# Determining glacier velocities from surface measurements

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## Abstract

Consider the problem of determining the velocity of a glacier flowing through a cross-section. The flow in the interior of the glacier is governed by a nonlinear elliptic PDE, and Dirichlet and Neumann boundary data are known at the glacier's surface. The base of the glacier is inaccessible to measurement, however, and it is unknown in general what the correct boundary conditions to prescribe at the base of a glacier are. It is therefore important to be able to indirectly observe basal boundary data by reconstructing solutions from surface measurements alone. This leads to an ill-posed Cauchy problem for the velocities. In this talk we discuss an efficient iterative scheme for finding approximate solutions of this Cauchy problem.

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