

## **p-Stokes equations - solution strategies and parameter identification**

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The dynamics of glaciers can be described by the p-Stokes equations, which are nonlinear partial differential equations. Solving these equations takes up most of the computation time for ice sheet models. Newton's method with a step size control finds the unique solution of these equations if we add a small diffusion term. We compare the computational effort with other step size controls and the Picard iteration for stationary and instationary problems with a sliding part and without a sliding part at the bedrock. The velocity field is dependent on the rheology and the basal friction. However, these parameters are unknown in real-world applications. Ice sheet models determine these quantities with the surface velocity by solving a parameter identification problem. We give some theoretical framework by proving existence of a solution and the Gâteaux differentiability of the control-to-state operator.