

A Variational Approach to Steady Glacier flows

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We discuss models of steady glacier flows in the Orlicz-Sobolev space framework. First, following to the approach of Jouvét and Bueler, steady, shallow ice sheet flow is formulated as an obstacle problem with the unknown as the ice upper surface and the obstacle as the underlying bedrock topography. The obstacle problem is written as a variational inequality. The corresponding PDE is highly nonlinear elliptic equation. Under appropriate assumptions, existence and uniqueness of variational solutions are shown. Next, extending slightly the framework of the model, making the power nonlinearity itself depend on the unknown variable corresponding to the ice upper surface, we study the existence of a solution under some conditions (joint work with J F Rodrigues).