Hibler's Time-Periodic Sea Ice Model on $\mathbb{R}^2$

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In 1979, Hibler introduced a model for the large-scale dynamics of sea ice, modeling it as a fluid with viscous-plastic rheology. The resulting momentum balance equation contains a stress tensor, which depends nonlinearly on the strain rate and on the ice strength. Here, the ice strength is given by the ice thickness characteristics - the mean ice thickness and the ice compactness -, which are in turn coupled to the system via continuity equations.

In this talk, we consider a regularized version of Hibler's model on the whole space $\mathbb{R}^2$ in a time-periodic framework. Our approach is based on interpreting the system as an abstract quasi-linear evolution equation and decomposing the linearized equation into a stationary and a purely oscillatory part. We will focus in particular on the challenges arising from the nonlinearities and the unboundedness of the domain and discuss possible strategies to overcome these difficulties.