

Well-Posedness for a Moving Boundary Model of an Evaporation Front in a Porous Medium

Georg Prokert^{1,*}, Friedrich Lippoth²

¹*Department of Mathematics and Computer Science, TU Eindhoven, The Netherlands*

²*(formerly) Institute Of Applied Mathematics, Leibniz University Hannover, Germany*

*Email: g.prokert@tue.nl

We consider a two-phase elliptic-parabolic moving boundary problem modelling an evaporation front in a porous medium [2]. Our main result is a proof of short-time existence and uniqueness of strong solutions to the corresponding nonlinear evolution problem in an L^p -setting. It relies critically on nonstandard optimal regularity results for a linear elliptic-parabolic system with dynamic boundary condition. We identify a nontrivial well-posedness condition that can be interpreted as a “linear combination” of the corresponding conditions for the Stefan and Hele-Shaw type problems to which the problem formally reduces in the single phases.

References

- [1] F. Lippoth and G. Prokert, Well-Posedness for a Moving Boundary Model of an Evaporation Front in a Porous Medium, to appear in *Journ. Math. Fluid Mech.*, Preprint [arXiv:1702.04530](https://arxiv.org/abs/1702.04530), (2017)
- [2] A.T. Il'ichev, and G.G. Tsyarkin, Catastrophic transition to instability of evaporation front in a porous medium, *Eur. Journ. Mech. B/ Fluids* **27** (2008), pp. 665–677