Analysis Seminar

Title: Well-posedness of the Geometric Thin-Film Equation

Speaker: Richard Smith

Date: Tue 24th October 2023 at 3:00PM

Location: E0.32 (beside Pi restaurant)

Abstract: The Geometric Thin-Film equation is a mathematical model of droplet spreading in the long-wave limit, which includes a regularization of the contact-line singularity. In a previous talk we showed that this equation has unique solutions that are $\frac{1}{2}$-Hólder continuous for all time $t \in \mathbb{R}^+$, and which can be expressed in terms of push-forwards of the initial positive Radon data $\mu \in \mathcal{M}(\mathbb{R})^+$.

In this talk we consider well-posedness of these solutions with respect to the 1-Wasserstein (or Kantorovich-Rubinstein) distance on the set of Radon probability measures $\mathcal{P}_1(\mathbb{R})$ having finite first moment. We show that the above solutions can be ill-posed if the initial data contains atoms, but are well-posed when the initial data is atomless. Optimal transport theory plays a key role in the proof of the second result.

This is joint work with Lennon Ó Náraigh and Khang Ee Pang (UCD).

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