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The Chinese University of Hong Kong

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Short Course

Jointly organized by Department of Mathematics, CUHK and The Institute of Mathematical Sciences, CUHK

Propagation Speed of Non-linear Parabolic Equations on Riemannian Manifolds

by

Professor Alexander GRIGORIAN
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Abstract: This course is about a doubly nonlinear parabolic PDEs that is also known as Leibenson's equation. It describes filtration of a compressible liquid through a porous medium. Particular cases of this equation are a parabolic p-Laplace equation as well as a porous medium equation. In R^n such PDEs have explicit fundamental solutions - Barenblatt solutions that exhibit finite propagation speed. The purpose of this course is to prove finite propagation speed for such PDEs on arbitrary Riemannian manifolds. The main technical tool for the proof is a non-linear mean value inequality, which is proved by a nonlinear version of Moser's iteration argument. Here is a list of topics to be covered:

1. Barenblatt solutions in R^n
2. Caccioppoli type inequality
3. Sobolev inequality on arbitrary manifolds
4. Mean value inequality
5. Finite propagation speed

Date:	2 February, 9 February, 16 February and 23 February 2023
Venue:	Room 222, Lady Shaw Building
	The Chinese University of Hong Kong, Shatin
Time:	10:00 a.m. – 12:00 noon.

All are Welcome!