



# **PolyU Numerical PDEs Seminar**

### A new flow dynamic approach for Wasserstein gradient flows

By

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#### Abstract

We develop a new flow dynamic approach for Wasserstein gradient flows. Motivatied by the classic JKO scheme, we develop a new class of Lagrangian schemes which only need to solve minimization problems with respective to displacement instead of density and velocity. The new approach can effectively capture the movement of the trajectory of meshes, and also can automatically preserve the nice properties of Wasserstein gradient flow structure, for example, positivity-preserving, mass conserving and energy dissipation. Numerical experiments are shown in 1D and 2D for Keller-Segel equations, Focker-Plancker equations, Porous medium equations.

#### Biography

Qing Cheng is currently a faculty member at Tongji University and has been selected for the Shanghai High-Level Talents Program. Dr. Cheng received his Ph.D. from Xiamen University in 2018. He subsequently served as a visiting assistant professor at the Illinois Institute of Technology from 2019 to 2021 and at Purdue University from 2021 to 2023. Dr. Cheng has received support from the National Science Foundation of China and has published academic papers in leading international journals, such as the SIAM Journal on Numerical Analysis, the SIAM Journal on Scientific Computing, Computational Methods in Applied Mechanics and Engineering, and the Journal of Computing and the Journal of Scientific Computing have been selected as ESI Highly Cited Papers. These papers have been cited by numerous prominent scholars, including members of the National Academy of Sciences, speakers at the International Congress of Mathematicians, SIAM Fellows, and AMS Fellows.

Date: 30 May 2024 (Thursday) Time: 14:00-15:00 (Beijing Time) Venue: TU817

## ALL ARE WELCOME