



**The Hong Kong Polytechnic University
Department of Applied Mathematics**

Colloquium

**Structure-preserving numerical methods for
constrained gradient flows of planar curves**

By

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Abstract

In this talk, we consider numerical methods for gradient flows with constraints for planar closed curves. Typical examples of such problems are area-preserving curve-shortening flow and the Helfrich flow. For the solution of the latter equation, the bending energy is dissipative (energy dissipation) and the length and the enclosed area are preserved (constraints). The aim of this study is to construct numerical schemes for these problems that inherit both the energy dissipation and the constraint(s). We discretize gradients for geometric quantities and Lagrange multipliers on the basis of the discrete gradient method. We also stabilize the scheme by introducing tangential velocities. This talk is based on the joint work with Prof. Miyatake (Osaka Univ.) and Prof. Sakakibara (Okayama Univ. of Science).

Bibliography

Prof. Tomoya Kemmochi got his PhD in University of Tokyo in 2018 and then directly enters Department of Applied Physics, Nagoya University, as an Assistant Professor. His research interests include numerical approximation to elliptic equations and parabolic equations, phase field problems, geometric curvature flows, and so on.

Date : 30 September, 2020 (Wednesday)

Time : 14:00-15:00 (Hong Kong Standard Time GMT +8)

Venue : Online Talk via Zoom(Meeting ID: 91150837115)

Speaker: Prof. Tomoya Kemmochi, Nagoya University

Host: Dr. Li Buyang, The Hong Kong Polytechnic University

Click to join : <https://polyu.zoom.us/j/91150837115>

* The Talk will be given in English.



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***** ALL ARE WELCOME *****

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