

PolyU Numerical PDEs Seminar

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Topic

Finite element approximation with tangential motion for fourth order geometric curve evolutions in arbitrary codimension

Date | Time

22 May 2024 (Wednesday) | 15:30 – 16:30 (HK Time)

Zoom

<https://polyu.zoom.us/j/87824339546?pwd=kVijbPQTJap2s0iRn9DNfai91jkZbg.1>

Meeting ID: 878 2433 9546

Passcode: 0522

Abstract

We introduce novel finite element schemes for curve diffusion and elastic flow in arbitrary codimension. The schemes are based on a variational form of a system that includes a specifically chosen tangential motion. We derive optimal L^2 - and H^1 -error bounds for continuous-in-time semidiscrete finite element approximations that use piecewise linear elements. In addition, we consider fully discrete schemes and, in the case of curve diffusion, obtain unconditional stability for it. Numerical simulations confirm the derived error bounds and suggest that the tangential motion leads to equidistribution of nodes in practice. This is joint work with Robert Nuernberg (Trento).