



The Hong Kong Polytechnic University Department of Applied Mathematics

Seminar

The linearly implicit two-step BDF method for harmonic maps into spheres

By

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Abstract

After recalling the notion of harmonic maps into spheres, we discuss two varia-tional formulations of the corresponding Euler–Lagrange equations. The second variational formulation leads easily to a linearization of the nonlinear equation. Subsequently, we focus on the gradient flow approach and recall known results for the linearly implicit Euler method, namely, energy decay (stability) and constraint violation properties.

Our contribution concerns the application of the linearly implicit two-step BDF method to the gradient flow problem. More precisely, we devise a projection-free iterative scheme for the approximation of harmonic maps that provides a second-order accuracy of the constraint violation and is unconditionally energy stable. A corresponding error estimate is valid under a mild but necessary discrete regularity condition. The considered problem serves as a model for partial differential equations with holonomic constraint.

For the performance of the method, illustrated via the computation of stationary harmonic maps and bending isometries, we refer to the manuscript on which the talk is based.

Date:29 November 2023 (Wednesday)Time:10:30-11:30 am (Hong Kong Standard Time GMT +8)Venue:Y306, Core YSpeaker:Prof. Georgios AKRIVIS, University of Ioannina, GreeceHost:Prof Buyang LI, Dr Zhi ZHOU, The Hong Kong Polytechnic University

* * * ALL ARE WELCOME * * *