

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

Colloquium

**Discontinuous Galerkin time-stepping methods:
Maximal regularity and a posteriori error estimates**

By

**Prof. Georgios Akrivis
University of Ioannina**

Abstract

We consider the time discretization of differential equations satisfying the maximal parabolic L^p -regularity property in (UMD) Banach spaces by discontinuous Galerkin methods. We use the maximal regularity framework to establish that the discontinuous Galerkin methods preserve the maximal L^p -regularity, satisfy corresponding a posteriori error estimates, and the estimators are of optimal asymptotic order of convergence. In our proofs, we use a suitable interpretation of the discontinuous Galerkin methods as modified Radau IIA methods in combination with the maximal L^p -regularity property of Radau IIA methods, established in 2016 by B. Kovács, B. Li and C. Lubich.

The main results are:

- The discontinuous Galerkin methods preserve the maximal L^p -regularity property. No logarithmic factors are required.
- Optimal order a priori error estimates in the maximal regularity framework.
- Optimal order a posteriori error estimates in the maximal regularity framework.

Bibliography

Professor Georgios Akrivis is a Full Professor at Department of Computer Science and Engineering, University of Ioannina, Greece. Professor Akrivis received PhD degree from University of Munich, Germany. He was an Assistant and Associate Professor at University of Crete, and he moved to University of Ioannina as Full Professor in 1995. Professor Akrivis' research interests include the numerical solution and analysis of linear and nonlinear evolutionary partial differential equations. He has published over 50 papers in journals like SIAM J. Numerical Analysis, Numerische Mathematik, and Mathematics of Computation. He is currently an Associate Editor of SIAM Journal on Numerical Analysis.

Date: 12 October 2021 (Tuesday)

Time: 15:00-16:00 (Hong Kong Standard Time GMT +8)

Venue: Online Talk via Zoom (Meeting ID: 948 4439 0431)

Speaker: Prof. Georgios Akrivis, University of Ioannina

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

Click to join:

<https://polyu.zoom.us/j/94844390431?pwd=MFNNb2k5NTYzZjd5cFBVa2ZxZDE5Zz09>



[Click to join \(Zoom\)](#)

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

For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 11 October 2021