

**The Hong Kong Polytechnic University
Department of Applied Mathematics****Colloquium****Lowest-Order Equivalent Nonstandard Finite Element Methods for Fourth-Order Plates****By****Prof. Neela NATARAJ
Indian Institute of Technology Bombay****Abstract**

The popular (piecewise) quadratic schemes for the fourth-order plate bending problems based on triangles are the nonconforming Morley finite element, the discontinuous Galerkin, the C^0 interior penalty, and the WOPSIP schemes. Those methods are modified in their right-hand side with $F \in H^{-2}(\Omega)$ replaced by $F(JI_M)$ and then are quasi-optimal in their respective discrete norms. The smoother JI_M is defined for a piecewise smooth input function by a (generalized) Morley interpolation I_M followed by a companion operator J . An abstract framework for the error analysis in the energy, weaker and piecewise Sobolev norms for the schemes is outlined for linear and semi-linear problems with quadratic nonlinearity. Applications include the biharmonic plate bending problem, stream function vorticity formulation of incompressible 2D Navier-Stokes problem, and the von Kármán plate bending problem. This is a joint work with C. Carstensen, G.C. Remesan, and D. Shylaja.

Bibliography

Neela Nataraj is a Professor in Department of Mathematics, Indian Institute of Technology Bombay. She was Head of Department of Mathematics between 2015 and 2018, and is currently Dean of the institute for Faculty Affairs. Her research interests include finite element methods, finite volume methods and discontinuous Galerkin methods for linear and nonlinear elliptic problems. She is a Fellow of the Indian Academy of Sciences, Fellow of National Academy of Sciences, invited speaker in International Conference of Women Mathematicians. She was in the Editorial Board of many journals in computational mathematics, including ESAIM: Mathematical Modelling and Numerical Analysis, Computational Methods in Applied Mathematics, Computers & Mathematics with Applications, International Journal of Numerical Analysis and Modelling.

Date: 20 September 2022 (Tuesday)**Time: 16:30-17:30 (Hong Kong Standard Time GMT +8)****Venue: Online Talk via Zoom (Meeting ID: 957 8434 5487)****Speaker: Prof. Neela Nataraj, Indian Institute of Technology Bombay****Host: Dr. Buyang Li, The Hong Kong Polytechnic University****Click to join:****<https://polyu.zoom.us/j/95784345487?pwd=T0ZwRDRUZEpZQzZGMFpzYTVla1krQT09>****[Click to join](#)***** * * ALL ARE WELCOME * * ***For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 19 September 2022