



DEPARTMENT OF APPLIED MATHEMATICS

應 用 數 學 系

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

**Colloquium**

**Numerical methods for Degasperis-Procesi equation with discontinuous  
solutions**

by

**Dr. Yinhua Xia**

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**Abstract**

In this talk, we develop the high order numerical methods for solving the Degasperis-Procesi (DP) equation which contains nonlinear high order derivatives, and possibly discontinuous or sharp transition solutions. The numerical methods include local discontinuous Galerkin (LDG) methods, spectral methods, finite volume and difference methods. The development of numerical schemes is based on the  $L^2$  stability and total variational bounded property. To reduce the oscillations arising from the discontinuity, different post-processing procedures are adopted in the LDG methods and spectral methods. For finite volume and difference methods, the weighted essentially non-oscillatory (WENO) reconstruction is used. The numerical simulation results for different types of solutions of the nonlinear Degasperis-Procesi equation are provided to illustrate the accuracy and capability of the methods.

**Biography**

Dr. Yinhua Xia got his B.S.C. in 2001 from Nankai University, and Ph.D. in 2008 from University of Science and Technology of China. He has been Postdoc in Brown University in 2008-2010, and visiting scholar in University of Wuerzburg in 2013-2014. Starting from 2010, Dr. Yinhua Xia is an Associate Professor in School of Mathematics Sciences, University of Science and Technology of China.

**Date : 16 March, 2017 (Thursday)**

**Time : 10:00a.m. – 11:00a.m.**

**Venue : TU801, The Hong Kong Polytechnic University**

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