

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

Seminar

**Maximum bound principle preserving integrating factor
Runge-Kutta methods for semilinear evolution equations
by**

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Abstract

A large class of semilinear evolution equations satisfy the maximum bound principle (MBP) in the sense that the time-dependent solution preserves for any time a uniform pointwise bound imposed by its initial and boundary conditions. Investigations on numerical schemes preserving the MBP attract increasing attentions in recent years and several existing results provide efficient MBP-preserving schemes up to second order at most. In this paper, we are devoted to studying the high-order MBP-preserving numerical schemes by means of the integrating factor Runge-Kutta (IFRK) method. Beginning with the space-discrete system of semilinear evolution equations, we present the IFRK method in the general form and show their preservation of the MBP under some certain conditions. In particular, we give the fourth order MBP-preserving IFRK scheme as an example and test its high efficiency by the numerical simulation of long-time evolutions. In addition, the convergence rates of the numerical schemes are shown theoretically and verified numerically.

Date : 24 March, 2020 (Tuesday)

Time : 10:30a.m. – 11:30a.m.

Venue : Online talk Via Tencent QQ

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