

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

**Colloquium**

**Structure preserving numerical methods for phase-field equations**

**By**

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**Abstract**

Phase-field equations have intrinsic structures such as energy dissipation and maximum principle preserving. It is desirable, sometimes necessary, to preserve these structures in a numerical scheme. In the first part of this talk, we present a new approach to deal with nonlinear terms in a large class of gradient flows. The approach is not restricted to specific forms of the nonlinear part of the free energy. It leads to linear and unconditionally energy stable schemes which only require to solve decoupled linear equations with constant coefficients. Hence, these schemes are extremely efficient and very accurate when combined with higher-order numerical schemes. In the second part, we establish a framework of monotone schemes for the Allen-Cahn equations, in which only several concise and reasonable conditions are assumed. These conditions can guarantee both the unique solvability and the maximum principle.

**Date : 14 May, 2020 (Thursday)**

**Time : 15:00-16:00**

**Venue: Online Talk via Zoom**

**\* The Talk will be given in English.**

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

For enrolment, please send your name and email (zoom's account) to [chingching.lu@polyu.edu.hk](mailto:chingching.lu@polyu.edu.hk) on or before 13 May 2020, Wednesday.