THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF APPLIED MATHEMATICS
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The Hong Kong Polytechnic University
Department of Applied Mathematics

Colloquium

Normalized gradient flow for computing ground states of Bose-Einstein condensates

By

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Abstract

The normalized gradient flow, i.e., the gradient flow with discrete normalization (GFDN) introduced by W. Bao and Q. Du (or the imaginary time evolution method), is one of the most popular techniques for computing the ground states of Bose-Einstein condensates (BECs). In this talk, we revisit the time discretizations for the GFDN and its generalization to the multi-component BECs. Several widely used time discretizations are demonstrated not accurate for computing the ground state solution in the general case, especially for the multi-component BECs with two or more constraints even for the most accepted linearized backward Euler schemes. More precisely, these schemes usually converge to a solution with an error depending on the time step size. To accurately and efficiently compute the ground state solution of BECs, we propose the gradient flow with Lagrange multiplier (GFLM) method which can be viewed as the modified GFDN by introducing the explicit Lagrange multiplier terms or an approximation of the continuous normalized gradient flow (CNGF).

Date : 22 April 2021 (Thursday)
Time : 10:00-11:00 (Hong Kong Standard Time GMT +8)
Venue : Online Talk via Zoom (Meeting ID: 926 7377 4846)
Speaker : Prof. Yongyong Cai, Beijing Normal University
Host : Dr. Xiao Li, The Hong Kong Polytechnic University
Click to join :
https://polyu.zoom.us/j/92673774846?pwd=dFBMUFNyVFZPQkpqOWhOZTJnTVlYdz09

Click to join (Zoom)

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