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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON PDE

Keller–Osserman Conditions for Monge–Ampère and Hessian Type Equations with Gradient Terms

Dr. Jingwen Ji

Southeast University

Abstract

The classical Keller–Osserman condition relates the growth of a nonlinearity to the existence of entire solutions of nonlinear elliptic equations. In this talk, we discuss extensions of this theory to fully nonlinear equations associated with the matrix $\Delta uI-D^2u$, with nonlinearities depending on both the unknown function and its gradient. The results are based on two companion works concerning the Monge–Ampère case and the k-Hessian case, respectively. Under suitable structural assumptions, we establish necessary and sufficient Keller–Osserman conditions for the existence of entire subsolutions. The analysis includes degenerate and singular gradient terms, as well as gradient coefficients that may change sign. We reveal how the determinant and Hessian structures lead to different thresholds for the gradient exponent. We also discuss the connection between entire subsolutions, global continuation of radial solutions, and finite-radius blow-up, together with quantitative estimates for the blow-up radius and radial profiles.

Date: 26 November 2026 (Thursday)

Time: 2:00pm

Venue: 3472

All are Welcome!