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Joint Geometric Analysis Seminar

(Part of MIST program)

On the convexity of general inverse σ_k equations and some applications

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Abstract

In this talk, I will show my recent work on general inverse σ_k equations and the deformed Hermitian-Yang-Mills equation (hereinafter the dHYM equation). First, I will show my recent result. This result states that if a level set of a general inverse σ_k equation (after translation if needed) is contained in the positive orthant, then this level set is convex. As an application, this result justifies the convexity of the Monge-Ampère equation, the J-equation, the dHYM equation, the special Lagrangian equation, etc. Second, I will introduce some semialgebraic sets and a special class of univariate polynomials and give a Positivstellensatz type result. These give a numerical criterion to verify whether the level set will be contained in the positive orthant. Last, as an application, I will prove one of the conjectures by Collins-Jacob-Yau when the dimension equals four. This conjecture states that under the supercritical phase assumption, if there exists a C-subsolution to the dHYM equation, then the dHYM equation is solvable.

Date: January 20, 2023 (Friday)
Time: 10:00am-11:00am (Hong Kong time)
ZOOM link: https://cuhk.zoom.us/j/91805734715

All are Welcome