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THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON PURE MATHEMATICS

Uniqueness of asymptotically conical Kähler-Ricci flow

by

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Abstract: A Kähler cone appears as a normal algebraic variety with one isolated singular point, and the Kähler-Ricci flow is expected to desingularize this singularity instantaneously. A precise example is given by Feldman, Ilmanen and Knopf in 2003. For any integers $k > n \geq 2$ and real number $p > 0$, they constructed a forward self-similar solution to Kähler-Ricci flow $g(t)_{t>0}$ on $\mathcal{O}(-k)$ (holomorphic line bundle over $\mathbb{CP}^{n-1}$) such that outside the zero section, when t tends to 0, such flow converges locally smoothly to the Kähler cone $\mathbb{C}^n/\mathbb{Z}^k$.

In 2019, Conlon, Deruelle and Sun generalize this result for any Kähler cone that admits a smooth canonical model. Given a Kähler cone (C_0, g_0) with its smooth canonical model M, one can find a unique forward self-similar solution to Kähler-Ricci flow $g(t)_{t>0}$ such that when t tends to 0, $\pi_* g(t)$ converges to g_0 locally smoothly outside the apex, where $\pi : M \mapsto C_0$ is a Kähler resolution.

In this talk, we will show that this desingularisation has a uniqueness property. Given $\tilde{g}(t)_{t\in(0,T)}$ a generic solution to Kähler-Ricci flow which satisfies some conditions such that $\pi_*\tilde{g}(t)$ converges to g_0 locally smoothly when t tends to 0 outside the apex, then $\tilde{g}(t) = g(t)$ for all $t \in (0, T)$. Especially, among the conditions that we suppose, we only need a $\frac{C}{t}$ bound for the Ricci curvature tensor of $\tilde{g}$.

Date : 06 August 2025 (Wednesday)

Time : 4:00p.m.-5:00p.m.

Venue : Room 4504 (Lift 25/26)

All are Welcome!