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Monge–Ampère type fully nonlinear equations on Hermitian manifolds

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Let (M^n, ω) be a compact Hermitian manifold of dimension $n \geq 2$, and χ a smooth real $(1,1)$ form on M. Define

$$\chi_u = \chi + \frac{\sqrt{-1}}{2}\partial\bar{\partial}u \text{ and } [\chi] = \big\{\chi_u : u \in C^2(M)\big\}.$$

Let $1 \leq \alpha < n$ and $\psi \in C^\infty(M)$, $\psi > 0$. We are concerned with the equation

$$\chi_u^n = \psi \chi_u^{n-\alpha} \wedge \omega^\alpha, \ \chi_u > 0 \text{ on } M. \tag{1}$$

For $\alpha = n$ this is the complex Monge-Ampère equation which was first studied by S.-T. Yau and T. Aubin on compact Kähler manifolds. When $\alpha = 1$, both ω, χ are Kähler and ψ is constant, equation (1) was introduced by S. Donaldson in the setting of moment maps. In this talk we report some recent results based joint work with Qun Li and other coauthors.

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