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Fully nonlinear elliptic equations for conformal deformation of Chern-Ricci curvatures

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Abstract

There are several ways to define Chern-Ricci curvatures for the Chern connection on a non-Kahler Hermitian manifold. We introduce a notion of mixed-Chern-Ricci forms, which naturally occur in geometric problems and seem interesting to study, and consider fully nonlinear elliptic equations for their conformal deformation. We establish a priori estimates and prove existence results for these equations under very general structure conditions.

Our work is motivated by the close connections of these equations to problems in non-Kahler complex geometry, and the fact that there have been increasing interests in fully nonlinear pde's beyond the complex Monge-Ampere equation from complex geometry.

We consider the Dirichlet and Neumann problems as well as equations on closed manifolds. We try to understand roles of subsolutions and concavity condition in establishing estimates for second derivatives, and clarify relations between different notions of generalized subsolutions.