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## The Cauchy problem for the complex homogeneous Monge–Ampère equation and geodesics in the space of Kahler metrics

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Mabuchi–Semmes–Donaldson defined a Riemannian metric on the space of Kahler metrics in a fixed class on any Kahler manifold  $(M, \omega)$ . Formally it is an infinite dimensional symmetric space of non-positive curvature. The geodesic equation is equivalent to an HCMA (complex homogeneous Monge–Ampère equation) on  $A \times M$  where  $A$  is an annulus. The boundary problem has been much studied, but there are few results on the initial value (Cauchy) problem, i.e. the exponential map of the symmetric space. Indeed, it is ill-posed and the problem is to figure out which initial data give solutions which last for some given length of time. I will discuss some past work and work-in-progress with Yanir Rubinstein on the Cauchy problem. We have a good understanding of the Cauchy problem in the toric case and some initial results on Riemann surfaces.

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