

ABSTRACT OF THE DISSERTATION

Geometric Curve Flows

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We study geometric curves flows whose invariants flow according to some soliton equations. We discuss the correspondences between the Schrödinger flows on Hermitian symmetric spaces and equations of the nonlinear Schrödinger(NLS) type. And we use these correspondences to construct Bäcklund transformations for these curve flows. We also study the geometric Airy curve flows on space forms whose invariants satisfy the vector modified KdV(vmKdV) type equations. The existence of solutions to the Cauchy problems of curve flows for periodic boundary conditions follows from the correspondence. We then obtain geometric algorithms to solve periodic Cauchy problems numerically.