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David Hoff* (hoff@indiana.edu), Department of Mathematics, Rawles Hall, Bloomington, IN 47405, and **Eugene Tsyganov** (entsygan@indiana.edu). *Time analyticity and backwards uniqueness of weak solutions of the Navier-Stokes equations of multidimensional, compressible flow.*

We prove that solutions of the Navier-Stokes equations of three-dimensional, compressible flow, restricted to fluid-particle trajectories, can be extended as analytic functions of complex time. One important corollary is backwards uniqueness: if two such solutions agree at a given time, then they must agree at all previous times as well as at subsequent times. Additionally, analyticity yields sharp estimates for the time derivatives of arbitrary order of solutions along particle trajectories. Our analysis depends on a careful study of solutions of a suitably complexified version of the Navier-Stokes system written in Lagrangean coordinates. (Received June 07, 2007)