

Semiflow selections in fluid dynamics

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Abstract

Well-posedness of systems describing the motion of fluids in the class of strong and weak solutions represents one of the most challenging problems of the modern theory of partial differential equations. To handle the problem of uniqueness, one possible way is to perform a semiflow selection, identifying, among all the solutions emanating from the same initial data, the one satisfying the semigroup property. We study under which assumptions it is possible to guarantee the existence of a semiflow selection for autonomous systems, choosing the Skorokhod space of càglàd functions as trajectory space. Subsequently, we apply this abstract machinery for systems arising in fluid dynamics, including the compressible Navier-Stokes system and models describing general non-Newtonian fluids.