A Linearized Model for Compressible Flow past a Rotating Obstacle: Analysis via Modified Bochner–Riesz Multipliers

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Abstract

Consider the flow of a compressible Newtonian fluid around or past a rotating rigid obstacle in R^3. After a coordinate transform to get a problem in a time-independent domain we assume the new system to be stationary, then linearize and use Fourier transform to prove the existence of a unique solution in L^q-spaces. However, in contrast to the incompressible case with multipliers based on the heat kernel the new multiplier functions are related to Bochner-Riesz multipliers and require the restriction $6/5 < q < 6$. It is a joint work with Reinhard Farwig from Technical University, Darmstadt.

Keywords: Compressible Navier-Stokes equations, rotating body, linearization, modified Bochner-Riesz multipliers.