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Acoustic Scattering by a Vortex Dipole ZHONGQUAN ZHENG, JUNJIAN ZHANG, Univ of Kansas — Acoustic scattering in vortical flow has been an interesting and practical topic, with applications in problems such as acoustic scattering of turbulent flow. In this study, the linearized Euler equation model is employed to investigate sound wave propagation over a subsonic counter-rotating vortex dipole. Both the stationary and moving due to mutual induction vortex dipoles are studied. The numerical scheme uses a high-order WENO scheme to accommodate the highly convective background flow at high Mach numbers. The simulation results are compared with the analytical solutions and literature data. The theoretical study is focused on the effects of three characteristic length scales in this problem: the incident sound wave length, the vortex core size, and the vortex dipole size. The directivity and scaling laws related to the vortex scattering effects are discussed.

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