Abstract Submitted
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Evaluating the far-field sound of a turbulent jet with one-way Navier-Stokes equations[1] ETHAN PICKERING, GEORGIOS RIGAS, California Institute of Technology, AARON TOWNE, Stanford University, TIM COLONIUS, California Institute of Technology — The one-way Navier-Stokes (OWNS) method has shown promising ability to predict both near field coherent structures (i.e. wave packets) and far field acoustics of turbulent jets while remaining computationally efficient through implementation of a spatial marching scheme. Considering the speed and relative accuracy of OWNS, a predictive model for various jet configurations may be conceived and applied for noise control. However, there still remain discrepancies between OWNS and large eddy simulation (LES) databases which may be linked to the previous neglect of nonlinear forcing. Therefore, to better predict wave packets and far field acoustics, this study investigates the effect of nonlinear forcing terms derived from high-fidelity LES databases. The results of the nonlinear forcings are evaluated for several azimuthal modes and frequencies, as well as compared to LES derived acoustics using spectral proper orthogonal decomposition (SPOD).

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