Abstract Submitted
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Computation of noise from separated flows using large eddy simulation[1] ZANE NITZKORSKI, KRISHNAN MAHESH, University of Minnesota — We investigate noise production from turbulent flow over bluff bodies using the Ffowcs-Williams and Hawkings (FW-H) acoustic analogy. We propose a dynamic end cap methodology to account for volumetric contributions to the far-field sound within the context of the FW-H acoustic analogy. The quadrupole source terms are correlated over multiple planes to obtain a convection velocity that is then used to determine a corrective convective flux at the FW-H porous surface. The proposed approach is first demonstrated for a convecting potential vortex. It is then applied to compute the noise from a cylinder at Re_D=89k, and a 45 degree beveled trailing edge at Re_c=1.9M. We compare our results for base flow and acoustic data to available computations and experiments. We demonstrate insensitivity of the end cap correction approach to end plane location and spacing, discuss the effect of dynamic convection velocity, and show better performance than commonly used end cap corrections. Finally, we discuss some physical mechanisms that generate the far-field noise.

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