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Construction of Perfectly Matched Layer in cylindrical coordinates with non-zero mean flow[1] SARAH PARRISH, FANG HU, Old Dominion University — Non-reflecting boundary condition is an essential component in developing computational fluid dynamics (CFD) and computational aeroacoustics (CAA) algorithms. Perfectly Matched Layer (PML) is a technique for developing non-reflecting boundary conditions. PML for linearized Euler equations, as well as its extension to the nonlinear Euler and Navier-Stokes equations, have been developed recently for computational grid in the Cartesian coordinates. In this work, PML for the Euler equations in polar coordinates will be presented. The central issue is the stability of the polar PML in the presence of a mean flow. A space-time transformation is utilized to modify the dispersion relations of the linear waves in the derivation process. A stability analysis is carried out for the PML equations in the polar coordinates. An added benefit of PML in the polar coordinates is that a mean flow in an arbitrary can be treated easily. Numerical examples will also be presented to demonstrate the validity and stability of the newly developed PML equations.

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