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Analytical Model for Axial-Azimuthal Thermoacoustic Modes in an Annular Combustor VISHAL ACHARYA, TIMOTHY LIEUWEN, Georgia Inst of Tech — Recent advances in theoretical models for azimuthal modes have highlighted their potential in accurately capturing the physics with minimal cost when compared to detailed simulations. Such models for annular combustors have considered multiple burners, effects of the plenum as well as effects of azimuthal mean flow to name a few. However, in all these models, only the azimuthal modes have been considered and as such cannot capture axial-azimuthal coupling of modes. In this paper, we consider an extension of these models by considering the axial extent of the annular combustor with a generic impedance boundary condition at the combustor exit. The inclusion of the axial mode is of practical relevance to combustors where axial-azimuthal modal coupling controls the Thermoacoustic instability of the system.

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