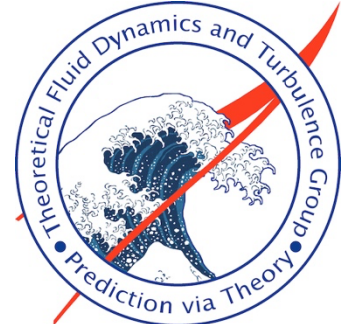


# Simplified Prediction of Near-field Jet Coherence using the Cross-Power Spectral Density Acoustic Analogy



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Steven A. E. Miller

University of Florida  
Department of Mechanical and Aerospace Engineering  
Theoretical Fluid Dynamics and Turbulence Group  
Gainesville, FL 32611  
saem@ufl.edu

The cross-power spectral density (CPSD) acoustic analogy is a generalization of Lighthill's analogy that directly predicts near-field statistics at multiple spatial points. The methodology was previously applied and validated to predict noise from isotropic turbulence and off-design supersonic jet flows. We present a simplification of the CPSD model for near-field predictions of acoustic coherence from jet fine-scale mixing noise. Validation predictions are presented with a NASA Glenn Research Center experimental jet database. The simplified mathematical model is presented along with the physical significance of each term. Application of the model can be applied to predict loading and coherence on the fuselage of aircraft, rockets, and associated structures. This approach can help designers minimize sonic fatigue or failure in flight-vehicles and support structures.

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