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Linear Stability Analysis of Round and Serrated Jets[1] KRISTJAN GUDMUNDSSON, TIM COLONIUS, California Institute of Technology — We investigate the velocity and pressure fluctuations of turbulent jets produced by round, and serrated nozzles. We model these fluctuations via the normal modes of the linearized equations and derive a generalized Rayleigh-equation for mean-flows composed of an arbitrary number of azimuthal harmonics, allowing fast solution of both the temporal and spatial stability problems. Using ensamble-averaged turbulent mean-flows from stereoscopic PIV data, we solve the generalized Rayleigh-equation and compare our predictions to instantaneous PIV measurements as well as near-field microphone measurements. Using the proper orthogonal decomposition to filter out uncorrelated fluctuations in data, we find good agreement between data and theory.

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Kristjan Gudmundsson
California Institute of Technology

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