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Parabolized stability equation (PSE) models for the prediction of mixing noise in turbulent jets: Comparison with Large Eddy Simulation[1] DANIEL RODRIGUEZ, TIM COLONIUS, California Institute of Technology, ARNAB SAMANTA, Indian Institute of Science, Bangalore, YASER KHALIGHI, CASCADE Technologies Inc, CALIFORNIA INSITUTE OF TECHNOLOGY TEAM, INDIAN INSTITUTE OF SCIENCE TEAM, CASCADE TECHNOLOGIES INC TEAM — The wavepacket structures responsible for the generation of the dominant low- frequency noise of turbulent round jets are modeled via PSE. To deliver meaningful results, PSE models require an accurate description of the disturbance conditions in the vicinity of the nozzle. The nature of the unforced turbulent flow avoids the existence of a single, deterministic initial condition. A high fidelity database obtained by Large Eddy Simulation is used to determine the initial conditions for the PSE modes: the total length of the simulation is split into several realizations, and Linear Stability Theory based biorthogonal decomposition is employed to initialize the PSE with the adequate wavepacket. The PSE solution corresponding to each realization is then compared with the wavepackets educed from the LES dataset. The ensemble of the realizations is considered then to study the effect of nondeterministic conditions on the wavepacket evolution.

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