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Towards the characterization of noise sources in a supersonic three-stream jet using advanced analysis tools CHRISTOPHER RUSCHER, SIVARAM GOGINENI, Spectral Energies, LLC — Strict noise regulation set by governing bodies currently make supersonic commercial aviation impractical. One of the many challenges that exist in developing practical supersonic commercial aircraft is the noise produced by the engine's exhaust jet. A promising method of jet noise reduction for supersonic applications is through the addition of extra exhaust streams. Data for an axisymmetric three-stream nozzle were generated using the Naval Research Laboratory's JENRE code. This data will be compared to experimental results obtained by NASA for validation purposes. Once the simulation results show satisfactory agreement to the experiments, advanced analysis tools will be applied to the simulation data to characterize potential noise sources. The tools to be applied include methods that are based on proper orthogonal decomposition, wavelet decomposition, and stochastic estimation. Additionally, techniques such as empirical mode decomposition and momentum potential theorem will be applied to the data as well.

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