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Sound radiation from annular jet ducts with impedance walls

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An analytical model for sound radiation from a semi-infinite annular duct with cylindrical infinite centre section and carrying a jet issuing into an uniform mean flow is presented. The interior of the outer wall of the duct is allowed to have an acoustic impedance. This is an extension to a recent model where only rigid walls were considered. The unstable cylindrical vortex layer attached to the edge of the duct, between the jet and the uniform mean flow, is considered. The geometry considered aims to model a turbofan exhaust, where sound generated at the inlet propagates along the annular duct and refracts through the bypass jet before radiating into the far field. In this paper the effect of the acoustic impedance of the duct outer wall on the radiated acoustic field is studied.