Studies of Sound Radiation From Beams with Acoustic Black Holes

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Abstract

Vibration and noise control of mechanical structures play an important role in the design of machine systems. Recently, acoustic black holes (ABH), a new passive structural modification approach to control vibration and noise from mechanical structures has been developed and studied. An acoustic black hole is usually a power-law taper profile due to which the wave velocity gradually reduces to zero. Also, the vibration energy gets concentrated at the locations of acoustic black holes due to the progressive reduction of wavelength. This paper presents the work on the influence of acoustical black holes on the vibration and sound field of beams. The studies investigate the vibrations and acoustic near fields of cantilever beams using the COMSOL Multiphysics® software. The aim of this study is to investigate the influence of the geometry of acoustic black holes on the vibration noise radiated from the cantilever beams.

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