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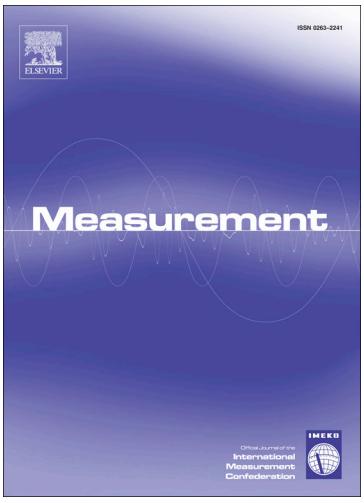

Numerically Estimating Acoustic Transmission Loss of a Reactive Muffler with and without Mean Flow

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Numerically Estimating Acoustic Transmission Loss of a Reactive Muffler with and without Mean Flow

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Abstract

The present work numerically mimic the measurement techniques used to measure the acoustic transmission loss (TL) of a muffler without and with mean flow. First, the three-pole measurement method has been simulated in frequency domain for estimating acoustic TL of a muffler without mean flow. Along with advantages and disadvantages, the inability of such method in estimating acoustic TL in presence of mean flow is highlighted. Such restriction has been resolved by establishing the time domain simulation of three-pole and four-pole measurement methods. The requirement of anechoic termination for three-pole method is well known. Therefore, the issues involved in simulating such boundary condition numerically in frequency and time domain analyses have been addressed. The necessities of boundary layer meshing, selection of appropriate solver, impulse simulation, requirement of non-reflecting velocity inlet, simulation of two-load boundary condition, and role of microphone spacing have been discussed in the context of TL evaluation in the presence of mean flow. Additionally, some recommendations

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