
Nonlinear Acoustic Wave Propagation inside Lined Waveguides

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The non-linearity effects which are due to the non-linearity of both the gas and acoustic properties of the lining materials play an important role in the attenuation of the sound inside acoustic waveguides. A mathematical model has been developed for non-linear wave propagation in a two dimensional lined acoustic waveguide with a porous splitter. A third order uniform expansion is obtained for non-linear acoustic wave propagation inside a two dimensional rectangular splitter lined waveguide. The results show that the non-linearity flattens and broadens the absorption vs frequency curve, irrespective of the geometrical dimensions.