A Neuro-fuzzy Computing Technique for Modeling the Acoustic Form Function of Immersed Tubes

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Abstract

An Adaptative Neuro-Fuzzy Inference System (ANFIS) is developed to predict the acoustic form function (FF) for an infinite length cylindrical shell excited perpendicularly to its axis. The Wigner-Ville distribution (WVD) is used like a comparison tool between the calculated FF by the analytical method and that predicted by the neuro-fuzzy technique for a copper tube. During the application of this technique, several configurations are evaluated for various radius ratio b/a (a: outer radius, b: inner radius of tube). This neuro-fuzzy technique is able to predict the FF with a mean relative error (MRE) about 1.7%.
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Index Terms

Computer Science

Applied Sciences
Keywords

ANFIS  acoustic scattering  cylindrical shells  Wigner-Ville distribution