National Institute of Technology Rourkela

Progress Seminar

Seminar Title	: Analytical model of acoustic scattering of a plane wave from infinite rigid scatterers with arbitrary cross-sections
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Venue	: CAD Lab, ID Department
Date and Time	: 24 Nov 2023 (5:00PM)

Abstract : This research ventures a brief literature survey on acoustic scattering fundamentals however, a vivid study was done on its physical and mathematical concepts, carrying forward with analysis of acoustic scattering properties using various geometry of scatterers. A conventional solution of incident wave followed by scattering wave found because of the plane wave is attained for acoustic scattering by a single or an arbitrary configuration of multiple scatterers. The standard analytical approach formally conveys the scattering by the superposition of scattered pressure, the phase difference of the scattering wave, and its interference phenomenon. An analytical approach is proposed for solving scattering field pressure generated due to an infinitely long single cylindrical scatterer with an arbitrary shape. The solution for the scattering coefficient is found in a linear combination of Bessel and Henkel functions using some specific boundary conditions applied to the surface (finite cylinder) or cross-section (infinite cylinder). It is observed that, as frequency rises, the scattering accumulates high in the forward direction, henceforth the phase difference falls to zero.

Keywords: *Acoustic scattering, Helmholtz equation, cylindrical scatterer, Neumann Boundary condition*