

A coupled “FE-Meshfree” RPIM-T3 element for two-dimensional acoustic radiation problems

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Abstract

To improve the accuracy of the standard finite element (FE) solutions for acoustic computation, this work presents the coupling of an radial point interpolation method (RPIM) with the standard FEM based on triangular (T3) mesh to give a coupled “FE-Meshfree” RPIM-T3 element for two-dimensional acoustic radiation problems. In this coupled RPIM-T3 element, the local approximation (LA) is represented by the polynomial-radial basis functions and the partition of unity (PU) concept is satisfied using the standard FEM shape functions. Incorporating the present coupled RPIM-T3 element with the appropriate non-reflecting boundary condition, the two-dimensional acoustic radiation problems in exterior unbounded domain can be successfully solved. The numerical results demonstrate that the present coupled RPIM-T3 have significant superiorities over the standard FEM and can be regarded as a competitive numerical techniques for exterior acoustic computation.

Keywords: Finite element (FE); FE-Meshfree; Acoustic radiation; Unbounded domain; Numerical method.