 ICCES, vol.20, no.3, pp.71-71

Theory, Analysis and Design of Fluid-Shell Structures

Lakis A. A., Toorani M. H., Kerboua Y., Esmailzadeh M., Sabri F.

Summary

This paper review focuses mainly on development and application of a hybrid finite element approach used for linear and geometrically nonlinear vibration analysis of isotropic and anisotropic plates and shells, with and without fluid-structure interaction. Development of a hybrid element for different geometries of plates and shells is briefly discussed. In addition, studies dealing with particular dynamic problems such as dynamic stability and flutter of plates and shells coupled to flowing fluids are also discussed. This paper is structured as follows: after a short introduction on some of the fundamentals of the developed model applied to vibrations analysis of shells and plates in vacuo and in fluid, the dynamic analysis of anisotropic structural elements is discussed. Studies on dynamic response of plates in contact with dense fluid (submerged and/or subjected to liquid) follow. These studies present very interesting results that are suitable for various applications. Dynamic response of shell type structures subjected to random vibration due to a turbulent boundary layer of flowing fluid is reviewed. Aeroelasticity analysis of shells and plates (including the problem of stability; divergence and flutter) in contact with light fluids (gases) are also discussed.