

AN EQUIVALENCE METHOD TO COMPUTE MECHANICAL PROPERTIES OF REPETITIVE STRUCTURES

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Abstract

In this study is described the conceptual approach to a computational methodology for the determination of the elastic characteristics of complex repetitive structures like the radiating surface of a satellite Antenna Array. The procedure uses a Finite Element structural analysis technique and can be applied for those complex structures that, if meshed with normal procedures, could originate a too high number of degrees of freedom. In addition, the proposed methodology results useful in a design synthesis phase when the influence of macroscopic variables over the global structural performances has to be assessed in a parametric way. This procedure can be used to study thin-walled complex structures, through a low number of degrees of freedom, and it is based on the inversion of the elasticity equation in the constitutive theory, where the unknowns are the stiffness matrix elements.