

Dynamic Analysis of Composite Doubly Curved Panels with Variable Thickness

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Abstract : Dynamic analysis of composite doubly curved panels with variable thickness subjected to different pulse types using Generalized Differential Quadrature method (GDQ) is presented in this study. Panels with variable thickness are used in the construction of aerospace and marine industry. Giving variable thickness to panels can allow the designer to get optimum structural efficiency. For this reason, estimating the response of variable thickness panels is very important to design more reliable structures under dynamic loads. Dynamic equations for composite panels with variable thickness are obtained using virtual work principle. Partial derivatives in the equation of motion are expressed with GDQ and Newmark average acceleration scheme is used for temporal discretization. Several examples are used to highlight the effectiveness of the proposed method. Results are compared with finite element method. Effects of taper ratios, boundary conditions and loading type on the response of composite panel are investigated.

Keywords : differential quadrature method, doubly curved panels, laminated composite materials, small displacement

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