ABSTRACT:

Free vibrational study of symmetric angle-ply laminated cylindrical shells of variable thickness including first order shear deformation theory using spline function approximation is studied. The equations of motion for the cylindrical shells are derived using first order shear deformation theory. The solutions of displacement functions are assumed in a separable form to obtain a system of coupled differential equations in terms of displacement and rotational functions, and these functions are approximated by Bickley-type splines of order three. The vibrations of three and five layered shells, made up of two different types of order of the layers of materials and two types of boundary conditions are considered. A generalized eigenvalue problem is obtained and solved numerically for an eigenfrequency parameter and an associated eigenvector of spline coefficients. Parametric studies are made for the frequency parameters with respect to the coefficients of thickness variations, length-to-radius ratio, length-to-thickness ratio and ply angles under different boundary conditions. In the present work, the results are expected to be more accurate and more suitable for immediate application in the areas of missiles, aviation, shipping, surface transport and a large number of industries related to the cement and chemicals.