On a remarkable geometric-mechanical synergism based on a novel linear eigenvalue problem

Abstract: The two coefficient matrices of a novel linear eigenvalue problem for structural analysis are the tangent stiffness matrix, in the framework of the Finite Element Method, at the load level considered and at the onset of loading. This eigenvalue problem serves as the tool for computation of the radii of curvature of two special curves on the surface of an *N*-dimensional unit hypersphere. The value of one of them is zero and that of the other one is one. The former is a minimum value. It correlates with the state of pure stretching of structures. The latter is a maximum value, correlating with the state of pure bending. The main purpose of this paper is to report on the numerical verification of this remarkable geometric-mechanical synergism as well as on current attempts of its extension to combinations of stretching and bending.