

## A State Space Formalism for Piezothermoelasticity of Functionally Graded Materials

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A state space formalism and solution approach for electromechanical analysis of functionally graded materials (FGM) is presented. The materials considered possess rectilinear anisotropy or cylindrical anisotropy of the most general kind. The novelty of the formalism lies in that the 3D equations of piezothermoelasticity are represented in full by a state equation and an output equation in which only a displacement vector, a stress vector, and six sub-matrices that characterize the material properties appear. On the basis of the formalism, the piezothermoelastic solution to a problem may be determined through its elastic counterpart by analogy and correspondence. The formalism embraces the Stroh formalism for plane problems and brings in matrix algebra in the solution process. When dealing with FGM, the material inhomogeneity renders the state equation non-uniform. Viable schemes for treating the non-uniform system are considered. The schemes are useful for problems both in Cartesian coordinates and in cylindrical coordinates.

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