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Three-dimensional solution for transient thermal stresses of functionally graded rectangular plate due to nonuniform heat supply. (English) Zbl 1192.74090

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Summary: This paper is concerned with the theoretical treatment of transient thermoelastic problem involving a functionally graded rectangular plate due to nonuniform heat supply. The thermal and thermoelastic constants of the rectangular plate are assumed to vary exponentially in the thickness direction. The transient three-dimensional temperature is analyzed by the methods of Laplace and finite cosine transformations. We obtain the three-dimensional solution for the simple supported rectangular plate. Some numerical results for the temperature change, the displacement and the stress distributions are shown in figures. Furthermore, the influence of the nonhomogeneity of the material is investigated.

MSC:

[74F05](#) Thermal effects in solid mechanics

[74K20](#) Plates

[80A20](#) Heat and mass transfer, heat flow (MSC2010)

Cited in **8** Documents

Keywords:

[thermoelasticity](#); [functionally graded material](#); [rectangular plate](#); [transient state](#); [three-dimensional problem](#)

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