Journal of Thermal Stresses ›
Volume 43, 2020 - Issue 1

Articles

NURBS-based thermal buckling analysis of graphene platelet reinforced composite laminated skew plates

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Pages 90-108 | Received 05 Jun 2019, Accepted 22 Sep 2019, Published online: 11 Oct 2019

Download citation https://doi.org/10.1080/01495739.2019.1673687

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Abstract

A nonuniform rational B-spline isogeometric finite element formulation is presented in this research to analyze the thermal buckling behavior of composite laminated skew plates reinforced by graphene platelets. Formulation is based on the first-order shear deformation plate theory. It is assumed that each layer of the composite laminated plate may have different volume fraction of graphene platelets leading to a through-the-thickness piecewise functionally graded medium. The equivalent properties of the plate are obtained by means of the Halpin–Tsai rule. The developed solution method may be used for arbitrary combinations of boundary conditions. The accuracy of the developed formulation is depicted via comparison studies with respect to the available data in the open literature. Novel numerical results are also given to show the effects of volume fraction of graphene platelets, distributed patterns of graphene platelets, and geometric characteristics of the skew plate.

Keywords: Composite plate graphene platelet reinforced composite Halpin–Tsai rule NURBS formulation thermal buckling

Additional information

Funding

This work has been financially supported by the Research Deputy of Shahrekord University. The grant number was 97GRN1M40504.