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LETTERS TO THE EDITOR

COMMENTS ON "NATURAL VIBRATION ANALYSIS OF CLAMPED RECTANGULAR ORTHOTROPIC PLATES"

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The authors are to be congratulated for their interesting application of the extended Kantorovich method for treating the problem of free vibrations of a clamped rectangular orthotropic thin plate [1]. On the other hand, Dalaei and Keer [1] determine fundamental frequencies only for a very limited number of available fundamental frequency parameters determined prior to 1952 [2] and 1969 [3]. Since then a large number of papers reporting innovative approaches and/or accurate frequency coefficients have been published [4–7].

Among these studies, Kim and Dickinson's paper [5] constitutes a remarkable one in view of its simplicity and accurary.

As shown in reference [6] simple polynomial approximations allow for a very simple and accurate determination of the fundamental frequency of orthotropic plates elastically restrained against rotation along the edges and subjected to a biaxial state of in-plane stress.

The approach presented in reference [6] was improved considerably in reference [7] by including an adjustable exponential parameter which allows for further optimization of the frequency parameter. It was shown in reference [7] that the numerical values are in very good agreement with those determined in reference [5]. Admittedly, the methodology developed in reference [5] allows for very general types of boundary conditions, including the free edge situation.

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AUTHOR'S REPLY

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The main purpose of the paper by Dalaei and Kerr was to demonstrate the accuracy of the extended Kantorovich method for clamped orthotropic rectangular plates. The obtained results agree very closely with those of Kanazawa and Kawai [2] and Leissa [3].

The discussors list and describe four other related papers. Their reference [4] deals with the case in which two parallel edges are simply supported, and therefore this problem is solvable by a Levy-type approach. The other three papers [5–7] use different boundary conditions and the solutions of the resulting formulations are not separable in an exact sense.

Therefore, these papers use approximate solutions that consist of products in x and y, in connection with an energy principle. In reference [5] these products are *assumed a priori* to be beam functions and in references [6] and [7] as polynomials, which satisfy the corresponding boundary conditions.

The advantage of the exteneded Kantorovich method is that the separation functions are not assumed, but rather are uniquely *generated* from the differential equation and boundary conditions of the corresponding problem. Using this method, also the effect of an in-plane force field may be easily included, as shown by Kerr [1] and El-Bayoumy [2].

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