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LETTERS TO THE EDITOR

A FURTHER NOTE ON THE "RECURRENCE SCHEME FOR THE GENERATION OF TWO-DIMENSIONAL BOUNDARY CHARACTERISTIC ORTHOGONAL POLYNOMIALS TO STUDY VIBRATION OF PLATES"

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The author congratulates Drs. Bhat *et al.* [1] on their very interesting presentation of the formulation utilizing the Rayleigh–Ritz method and incorporating a recurrence scheme to generate two–dimensional orthogonal polynomials that satisfy the essential boundary conditions for plate–vibration analysis.

This published letter offers two contributions:

- The extension of method of generation of orthogonal polynomials by Kowalski [2] to that which satisfies the essential boundary conditions of the rectangular plate.
- Verification of the orthonormality of the aforementioned polynomials generated by the extension of Kowalski [2].

With regard to the previous work on the use of two-dimensional orthogonal polynomials which satisfy the essential boundary conditions, the incorporation of a recurrence scheme for the polynomial generation together with the Rayleigh–Ritz method has been extensively used by a group of previous authors for free vibration analysis of various plate structures. These studies are namely Lam *et al.* [3–5], Lam and Liew [6], Liew and Lam [7–9] and Liew *et al.* [10–11]. In these studies, rectangular and skewed plates were considered. In addition, circular and elliptic plates were also considered.

In these studies [3–11], the Gram–Schmidt process was employed to generate the two-dimensional orthogonal polynomials which satisfy the essential boundary conditions. Thus the authors' statement which claims that "no such recurrence relation was employed in constructing the two–dimensional boundary orthogonal polynomials" is not exactly accurate in light of references [3–11]. Also, the following authors' statement which infers that all previous studies in terms of construction of two-dimensional boundary characteristic orthogonal polynomials "were generated by orthogonalizing with all the previously generated orthogonal polynomials" is inaccurate again in light of references [3–11]. As in the authors

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paper (Bhat, Chakraverty and Stiharu), the recurrence scheme used in references [3–11] makes use of the two latest generated polynomials in generating a new one.

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AUTHORS' REPLY

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The idea of constructing orthogonal polynomials, satisfying the boundary conditions of vibrating structures, using the Gram–Schmidt orthogonalization process, was originally proposed by Bhat [2] in 1985. These were used to study the vibration of one-dimensional structures or vibration of rectangular plates where