Available online at www.sciencedirect.com
SCIENCE DIRECT

Journal of Sound and Vibration 266 (2003) 389–390

JOURNAL OF SOUND AND VIBRATION

www.elsevier.com/locate/jsvi

Letter to the Editor

Comments on "A parametric study on vibrating clamped elliptical plates with variable thickness"

S.A. Vera*, P.A.A. Laura

Department of Engineering and Physics, Institute of Applied Mechanics, Universidad Nacional del Sur, Av. Alem 1253, Bahía Blanca 8000, Argentina

Received 9 October 2002; accepted 13 December 2002

The authors are to be congratulated for the useful information provided in their letter [1]. However, certain statements made by the authors in the Introduction require clarification. Historically the starting point of the "moment method" was the famous Galerkin approach applied to mechanical sciences problems. Its generalization is the moment method which has been used by the authors [1] using the set $\bar{x}^i$ ($i = 0$,2 and 4). In general, large differences with Rayleigh–Ritz method are noticed.

On the other hand in the case of self-adjoint problems where all boundary conditions are satisfied it can be shown mathematically that the Rayleigh–Ritz approach and the Galerkin method are equivalent. Hence they yield identical results, certainly if the same co-ordinate functions are used [2].

It is also interesting to point out that the classical "internal-point" collocation method, where co-ordinate functions which identically satisfy the boundary conditions are used, and the "error" or "residual" function is required to vanish at N-internal points, i.e.,

$$\varepsilon(x,y)|_{xi,yi} = 0 \quad (i = 1, 2, ..., N), \tag{1}$$

may be also considered as a special case of the moment method if use is made of the product of 2 Dirac delta functions

$$\delta(x - x_i)\delta(y - y_i),$$

and accordingly, Eq. (1) may be expressed as

$$\int\int_D \varepsilon(x,y)\,\delta(x - x_i)\,\delta(y - y_i)\,\mathrm{d}x\,\mathrm{d}y = \varepsilon(x_i, y_i) = 0 \quad (i = 1, 2, ..., N), \tag{2}$$

where D is the domain under study.

This approach may be extended to three-dimensional problems.

*Corresponding author.
E-mail address: svera@criba.edu.ar (S.A. Vera).

0022-460X/03/$ - see front matter
doi:10.1016/S0022-460X(03)00048-8

The collocation or point-matching approach was initially used in atomic physics problems almost 8 decades ago and after that was extensively used in applied mechanics problems [2]. By the mid 1960s it started to be used in electromagnetic theory, specially in the determination of cut-off frequencies of electromagnetics waveguides [3,4].

In some instances the governing differential equation is solved exactly and the boundary conditions are satisfied at a discrete number of points N [3,4]

Acknowledgements

Research on structural dynamics is sponsored by CONICET, Secretaría de Ciencia y Tecnología of Universidad Nacional del Sur and by TECHINT.

References

[1] I. Bayer, U. Güven, G. Altay, A parametric study on vibrating clamped elliptical plates with variable thickness, Journal of Sound and Vibration 254 (2002) 179–188.
[2] S. Crandall, Engineering Analysis, McGraw-Hill, New York, 1965.
[3] P.A.A. Laura, Application of the point-matching method in waveguide problems, IEEE Transactions of Microwave Theory and Techniques MTT 14 (1966) 251.
[4] P.A.A. Laura, K. Rodriguez, Comments on "The point-matching method on dissipative silencers of arbitrary cross-sections", Journal of Sound and Vibration 201 (1997) 127–128.