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Letter to the Editor

Comments on "Normal modes of a continuous system with quadratic and cubic non-linearities"

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The author is to be congratulated for his excellent treatment of the free vibrations problem of simply supported beams resting on elastic foundation having quadratic and cubic non-linearities [1].

On the other hand, when deriving the expression for the error or residual function $\varepsilon(x,t)$, once he substitutes $u(x)\cos(\omega t)$ in his Eq. (1) and the requirement that ε be orthogonal with respect to the assumed approximate solution

$$\int_0^{2\pi} \varepsilon(x,t)u(x)\cos(\omega t)\,\mathrm{d}(\omega t) = \int_0^{2\pi} \varepsilon(x,t)\cos(\omega t)\,\mathrm{d}(\omega t) = 0, \tag{1}$$

the author refers to this procedure as "Ritz method".

Since we encourage our graduate students to read the current issues of JSV, some of them consulted us about the name of the author's procedure, where no connection of the given equation with variational problems is shown to exist. Accordingly it seems to us, that it must be called Galerkin's method since it was formulated by Galerkin [2].

Certainly for problems connected with variational problems, the Galerkin approach and the Ritz method are related in a close fashion and, in a number of cases, they are equivalent. As stated in Ref. [2] with regards to the Galerkin method "it can be applied with success to equations of diverse types: elliptic, hyperbolic, parabolic, even though they are utterly unconnected with variational problems; it is superior in this respect to the Ritz method".

References

[1] M.I. Qaisi, Normal modes of continuous system with quadratic and cubic non-linearities, *Journal of Sound and Vibration* 265 (2) (2003) 329–335.

[2] L.V. Kantorovich, V.I. Krylov, *Approximate Methods of Higher Analysis*, Interscience Publishers, New York, 1964.

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