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LETTER TO THE EDITOR

Discussion of "Out-of-plane dynamic response of curved beams—an analytical model", *Int. J. Solids Structures*, Vol. 24, pp. 271–284 (1988)

In their recent paper, Silva and Urgueira (1988) presented an analytical model for the out-of-plane vibration response of planar curved beams and, most importantly, compared their theoretical results with those from previous models. In times of proliferation of scientific papers, comparison of models and results being published with those already published is essential to help readers in discerning the real advances.

The theoretical model used in the paper to describe the linear dynamics of the beams is by Rao (1971). One may ask why Rao's more concise formulation (two equations instead of three) is not used directly in the paper. Since no reasons were stated for this change, one may be led to believe that Rao's formulation is wrong. And on the subject of structural damping effects, Irie *et al.* (1980) also included the complex representation of the elastic and shear moduli (Snowdon, 1968) in Rao's model. It would therefore be interesting to have comments on the differences with Irie *et al.*'s internally damped model and have one numerical case of reference (Irie *et al.*, 1980) (transfer matrix method) solved by the analytical method of the paper. Also, a short discussion stating the major differences between the method of solution used by the authors and that developed by Wang *et al.* (1984) would be informative.

Finally, the discussers had some difficulty to figure out the particular case $\alpha = 0^\circ$ presented in Fig. 5 of Silva and Urgueira (1988). As stated in the paper, the only difference between the model used by the authors and that of Wang *et al.* (1984) is the effect of rotary inertia due to the torsional motion arising in coupled twist-bending vibrations. In the discussers' minds, and as the governing equations of the model make it clear, the coupling between torsional and flexural vibrations vanishes as the initial configuration of the beam becomes straight ($\alpha = 0^\circ$, R infinite). Following these pre-calculation considerations, it is surprising to observe that the results from the two models do not converge to identical values of frequency as the angle α approaches 0°.

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