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Technical Comments

Comment on "Reply by Author to A. H. Flax"

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CHOPRA,[1] in his Reply to my Comment[2] on his Note,[3] seems to have missed one of the main points of my remarks. He states that, for the special cases of supersonic panel flutter which he treated, his procedures given in Ref. 1 will lead to the same results as those indicated in Ref. 2, the two procedures being merely alternative ways of arriving at the same answer. This is not the case. In fact, Chopra's new interpretation[1] of the formulas he presented in Ref. 3 leads to a recipe which cannot be carried out at all.

The transformation given in Ref. 2 relating the curve of λ vs g_T for a panel unrestrained by an elastic foundation to the corresponding curve for a panel restrained by an elastic foundation of stiffness, $K=K_I$, is unique and one to one for corresponding points on the curves. The transformation depends on a knowledge not only of g_T, the damping coefficient, and λ, the flutter speed parameter, but also of ω_F, the flutter frequency. With this information, it is possible to relate points on the two curves at the same value of λ by the formula[2]

$$g_{Te} = g_T / (1 + K_I / m\omega_F^2)^{1/2} \tag{1}$$

where the subscript e refers to the panel on an elastic foundation. This transformation carries point A on the flutter boundary of the unrestrained panel to the point A' of the flutter boundary of the elastically restrained panel, as shown in Fig. 1.

If point A is, in fact, the flutter point of the unrestrained panel (corresponding to a given value of g_T) and if the only change in the physical parameters of the panel is the addition of the restraint of an elastic foundation, the flutter point of the restrained panel is the point B' on the transformed curve. However, there is no way to proceed directly from point A to point B'. Instead, the transformation to B' must be from point B. One cannot use Eq. (1) or any formula given by Chopra[3] to determine the value of damping corresponding to

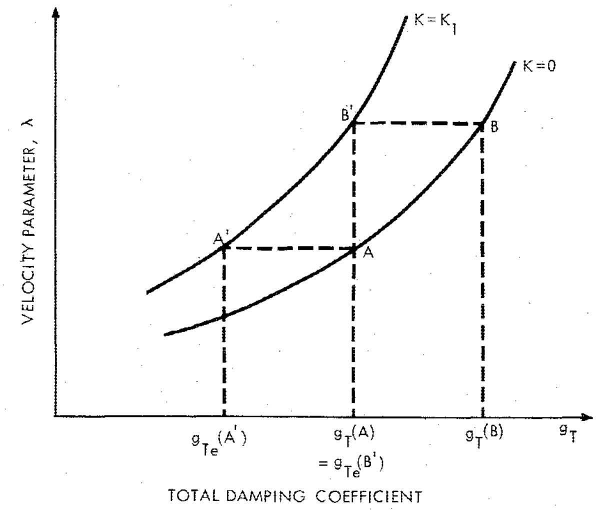

Fig. 1 Transformation of stability boundary.

point B, since the flutter frequency for point B is not known in advance.

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Comment on "Natural Frequencies of a Cantilever with Slender Tip Mass"

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IN Ref. 1, Bhat and Kulkarni have compared a perturbation solution attributed to Bhat and Wagner with the exact solutions for the vibration frequencies of a uniform cantilever beam with a tip mass M having an angular moment of inertia about its center of gravity J_0 for which the center of gravity may be displaced from the point of attachment of the beam by a distance L. Forming nondimensional quantities in terms of the length of the cantilever ℓ and its mass per unit length m,

$$\alpha = M/m\ell, \quad \epsilon = L/\ell, \quad \beta = J_0/m\ell^3 \tag{1}$$

are defined. The unperturbed problem has given α and β with $\epsilon = 0$; ϵ is the perturbation parameter.

The authors of Ref. 1 conclude that the perturbation method, including terms up to the second order, gives good results except for the case $\beta = 0$. Unfortunately, their formulas for the perturbation method appear to be in error, and this, in turn, gives rise to large errors in their numerical results for the perturbation method in the case $\beta = 0$, leading finally to their incorrect conclusion that the perturbation method fails in some way for $\beta = 0$. The first-order errors in the numerical

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