cases Ref. 1 shows good agreement between the frequencies derived from second-order perturbation theory and the exact values. First, the larger numerical values of terms in β in the denominator of the formula for λ_1 and in both the numerator and denominator of the formula for λ_2 would tend to reduce the effects of the missing terms. Second, as is evident from the curves of frequency based on the exact solution in Ref. 1 for $\beta \neq 0$, the magnitudes of the changes in frequencies with ϵ are reduced substantially. Physically this corresponds to the well-known effect of large concentrated masses and rotational inertias in producing effective nodes in the normal modes. Addition of mass at a true translational node has no effect on the frequency to which that node belongs, and mass at an effective node (a point at which the vibration amplitude is small in comparison with its average value) produces small effects. Rotational inertia at node similarly has no effect when added at a true rotational node and small effect when added at an effective node. The combined effects of additions of mass and rotational inertia to the tip of a beam have been discussed in terms of a simplified model by Rayleigh (Ref. 2, pp. 289-291).

There are, in addition, other anomalies in the curves presented in Ref. 1 which cannot be explained in terms of the corrections to the formulas for λ_1 and λ_2 just given. For example, numerical or graphical errors must be the cause of the apparent variation in frequency parameter with ϵ for the higher modes with $\beta = 0.05$, $\alpha = 0$ in Fig. 3 of Ref. 1. When $\alpha = 0$, the tip mass is zero, and its displacement ϵ has zero effect according to both the exact theory and perturbation theory.

Refernces

[1] Bhat, R. and Kulkarni, M. A., "Natural Frequencies of a Cantilever with Slender Tip Mass," *AIAA Journal*, Vol. 14, April 1976, pp. 536-537.

[2] Rayleigh, B., *The Theory of Sound*, Vol. I, Dover, New York, 1945, pp. 113-118, 289-291.

Comment on "Analysis of Transonic Cascade Flow Using Conformal Mapping and Relaxation Techniques"

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THE bilinear transformation of Ref. 1, described in detail by Eqs. (3) and (4a-e), can be given in a simpler form by using the properties of points symmetrical with respect to the unit circle:

$$\eta = \frac{(\zeta - B)C - (\zeta\bar{B} - 1)\,|C|S}{(\zeta\bar{B} - 1)\,|C| - (\zeta - B)CS}$$

where

$$C = \frac{A\bar{B} - 1}{A - B}$$

$$S = |C| - \sqrt{|C|^2 - 1}$$

In the original transformation of Ref. 1 the constants β and γ become singular if $B = -A$. Also, the constant S is unnecessarily defined as a minimum of $\sqrt{|\chi + (\chi^2 - 1)^{1/2}|}$ and $\sqrt{|\chi - (\chi^2 - 1)^{1/2}|}$ since the first expression is greater than one and the second less than one if $|A|, |B| < 1$.

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References

[1] Ives, D. C. and Liutermoza, J. F., "Analysis of Transonic Cascade Flow Using Conformal Mapping and Relaxation Techniques," *AIAA Journal*, Vol. 15, May 1977, pp. 647-652.

Errata

MHD Oscillatory Flow Past a Semi-Infinite Plate

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EQUATION (3) will read as follows

$$\frac{\partial T}{\partial t} + u\frac{\partial T}{\partial x} + v\frac{\partial T}{\partial y} = \alpha\frac{\partial^2 T}{\partial y^2} + \frac{\mu}{\rho C_p}\left(\frac{\partial u}{\partial y}\right)^2 - \frac{u}{C_p}\left[\frac{\partial U}{\partial t} + U\frac{\partial U}{\partial x} + \frac{\sigma B_0^2}{\rho}U\right] + \frac{\sigma B_0^2}{\rho C_p}u^2 - \frac{1}{C_p}U\frac{\partial U}{\partial t} \quad (3)$$

The additional last term on the right-hand side of Eq. (3) does not affect Eqs. (6-11).

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