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Journal of Sound and Vibration 265 (2003) 897–898

JOURNAL OF SOUND AND VIBRATION

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Letter to the Editor

# Comments on "On the eigenfrequencies of a two-part beam–mass system"

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Received 1 August 2002

Kopmaz and Telli [1] considered the transverse vibration of a system consisting of a rigid body carried by two uniform beams of different flexural rigidity and length and pinned at the ends. Account was taken of the axial width of the body and it was assumed that the centre of mass of the body was at the mid-point of the axial width. Two co-ordinate systems (in contradirections) were used in the analysis. The mode shape of the two portions was expressed in transcendental form with a total of 8 constants of integration. Four of the constants were eliminated from the boundary conditions (simply supported). Continuity of slope and of deflection of the rigid body yielded two equations and compatibility of forces and moments acting on the body yielded two more equations. The frequency equation of the simply supported system was expressed as a fourth order determinant equated to zero. A MATLAB-code was used to obtain the roots of the frequency equation.

Eq. (10) of Ref. [1] is based on the compatibility of moments acting on the body. The shearing forces on either sides of the body are not necessarily equal and Eq. (10) must include the term $0.5b[E_1I_1y_1'''(a,t) - E_2I_2y_2'''(c,t)]$. In Eq. (34), the elements $d_{41}$ through to $d_{44}$ do not seem to include the effect of the shearing forces.

Naguleswaran [3] considered a more general problem and considered the case in which the centre of mass of the rigid body was not at the mid point of the body. The frequency equations for 16 combinations of classical boundary conditions were expressed as second order determinants equated to zero. The first three frequency parameters for several combinations of system parameters were tabulated.

The method of analysis in Ref. [1] was used by Jang and Bert [2] in the classical paper on vibration of Euler–Bernoulli beams with one step change in cross-section.

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doi:10.1016/S0022-460X(02)01620-6

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