

## Corrigendum to the paper by

D. H. Keuning: Exact Resonant Frequencies for the Thickness-Twist Trapped Energy Mode in a Piezoceramic Plate, *Journal of Engineering Mathematics*, Vol. 6 (1972) No. 2, 143–154

In the above-mentioned paper an asymptotic behaviour of the quotient

$$(\Omega_r - \Omega_e)/(\Omega_u - \Omega_e) \quad (1)$$

for large values of the dimensionless thickness  $t$  was assumed yielding a limit, dependent of the coupling factor and smaller than 1 as  $t \rightarrow \infty$ . In this note the assumed behaviour is corrected and it is shown that expression (1) tends to 1 for  $t \rightarrow \infty$  in accordance with the results given in [1].

Interchanging orders of integration in (4.1) we obtain

$$\int_{-1}^1 W(t^{-1}|x-\rho|) G(\rho) d\rho = 0, \quad -1 \leq x \leq 1 \quad (2)$$

where ([6])

$$W(s) = \sum_{n=0}^{\infty} \left[ \frac{\exp\{-(n+\frac{1}{2})\pi s\}}{n+\frac{1}{2}} - k^2 \frac{\exp[-\pi s\{(n+\frac{1}{2})^2 - (\Omega/\pi)^2\}^{\frac{1}{2}}]}{\{(n+\frac{1}{2})^2 - (\Omega/\pi)^2\}^{\frac{1}{2}}} \right] \quad (3)$$

$W(s)$  has the expansion

$$W(s) = -(1-k^2) \log \frac{\pi s}{4} - k^2 A + O(s) \quad (4)$$

for  $s \rightarrow 0$ .  $A$  is a function of  $\Omega$ ,

$$A = \sum_{n=0}^{\infty} \left[ \frac{1}{\{(n+\frac{1}{2})^2 - (\Omega/\pi)^2\}^{\frac{1}{2}}} - \frac{1}{n+\frac{1}{2}} \right] \quad (5)$$

Substituting (4) into (2) and neglecting the order term, we obtain

$$\int_{-1}^1 \left[ \log|x-\rho| - \log\left(\frac{4t}{\pi}\right) + \frac{k^2}{1-k^2} A(\Omega) \right] G(\rho) d\rho = 0, \quad -1 \leq x \leq 1. \quad (6)$$

Differentiation of (5) with respect to  $x$  yields a singular integral equation with the solution

$$G(\rho) = C(1-\rho^2)^{-\frac{1}{2}} \quad (7)$$

in accordance with the numerical results.  $C$  is an arbitrary constant. Substitution of (7) into (6) yields a transcendental equation with the solution  $\Omega = \frac{1}{2}\pi$  for  $t \rightarrow \infty$ . Hence (1) tends to 1. Further computations show that the solution of (6) for expression (1) is in accordance with table I for  $t = 100$ . The figures 3 and 4 must be corrected for  $0 \leq t^{-1} < 0.01$  only.

### Acknowledgement

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### REFERENCES

- [1] D. H. Keuning, Exact Equations for Analysing Thickness-Twist Trapped-Energy Modes in Monolithic Filters, to be published in *Journal of Engineering Mathematics*, vol. 7, 1973.