DISCUSSION

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I recently used Mr. Levy's equations to make a structural analysis of an axisymmetric structure which included a number of short thick-walled cylindrical shells. In the analysis, I found that the K-constants for equation (12) could not be determined with sufficient accuracy from the figures and I obtained analytical expressions for each K-constant. As, I am sure, others will find Mr. Levy's paper very useful, I include here the analytical expressions for the K-constants.

Let

l = axial length of shell
r = radius of midplane of shell
h = thickness of shell
β = shell constant
g = groupings of terms

$$g_1 = 0.59\,\frac{h}{r}$$

$$\beta = \sqrt{\frac{1.65227}{rh}}$$

$$g_2 = \beta\sqrt{1 + g_1}$$

$$g_3 = \beta\sqrt{1 - g_1}$$

$$g_4 = \sinh g_2 l$$

$$g_5 = \cosh g_2 l$$

$$g_6 = \sin g_3 l$$

$$g_7 = \cos g_3 l$$

$$g_8 = g_4^2 g_3^2(1 + 2g_1)^2 - g_6^2 g_2^2(1 - 2g_1)^2$$

$$K_1 = \frac{5.6 g_1 l^2}{g_8 h^2}\,[g_4^2 g_3^2(1 + 2g_1) + g_6^2 g_2^2(1 - 2g_1)]$$

$$K_2 = \frac{11.2 g_1 g_2 g_3 g_4 g_6 l^2}{h^2 g_8}$$

$$K_3 = \frac{2g_2 l}{g_4 g_8(1 + 2g_1)}\,\{g_5 g_8 - g_6 g_2(1 - 2g_1)[g_4 g_7 g_3(1 + 2g_1) - g_5 g_6 g_2(1 - 2g_1)]\}$$

$$K_4 = \frac{2g_2 g_3 l}{g_8}\,[g_5 g_6 g_2(1 - 2g_1) - g_4 g_7 g_3(1 + 2g_1)]$$

$$K_5 = \frac{11.2 g_1 g_2 g_3 l^3}{g_8 h^2}\,[g_4 g_5 g_3(1 + 2g_1) + g_6 g_7 g_2(1 - 2g_1)]$$

$$K_6 = \frac{11.2 g_1 g_2 g_3 l^3}{g_8 h^2}\,[g_4 g_7 g_3(1 + 2g_1) + g_5 g_6 g_2(1 - 2g_1)]$$

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Author's Closure

It is a pleasure to have the addition to the paper provided by Mr. Wallach. The analytical expressions he has provided for K constants should considerably simplify the application of the results where computing machines are to be used. They will also be of great benefit where more precise values are needed than can be readily read from the curves in the paper.