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Discussion

Response to discussion on "Free vibration of super elliptical plates with constant and variable thickness by Ritz method"

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The discussers are appreciated for their study which provides highly precise results for the problem in terms of both benchmarking values and additional results.

Herein some items are clarified in order to avoid any misunderstanding.

1. The discussers have compared the results of their study with the ones presented in the original article [1] and there are significant dissimilarities in some of the results. They have reported some differences in the perimeter and area of the super ellipses and the frequency parameters. It should be noted that convergence of perimeter and area prevents only the error resulting from integration, but it does not necessarily lead to very accurate frequency parameters. It seems that the discussers have overlooked Table 1 in the original article [1], which shows the shape functions employed in [1].

Frequency parameters strongly depend on selected shape functions. For example, the first shape function in Table 1 of [1] is an even function, therefore only symmetric modes can be obtained by using this shape function. In the same table, the employed shape functions for each mode are presented and they contain only up to 10 terms. This was done to avoid long computational run times. The shape function employed by Bambill et al. requires high computing power and can give very accurate frequency parameters for several modes compared to the ones used in [1].

The results obtained by Bambill et al. clearly involve the results of [1] with higher precision. But, as the shape functions used in [1] are constrained, the modes which are not pertinent to those functions cannot be obtained. Therefore, the results of Bambill et al. include some modes which can never be obtained by the shape functions utilized in [1] and comparing those sets of frequency parameters sequentially may result in large differences, because the compared parameters may correspond to different mode shapes.

2. For simply supported plates with curved boundaries, the variation of Poisson's ratio, ν, affects the frequency parameters. In the original article this effect is investigated and it is mentioned that such considerations are missing in Wang et al. [2]. The discussers indicate that comment is flawed, because their comparisons show that the results of Wang et al. correspond to the results which can be obtained by the use of $\nu=0.3$. This is true, but in [1] the Authors did not mean to imply that Wang et al. had removed the parts which include 'ν' from the governing equations. Without comparing the results obtained by different ν values, this effect cannot be seen. Therefore, in the original article, the frequency parameters are presented for different ν values, and the obtained results are discussed in a manner which considers the variation of ν. An argument about the existence of ν is not intended in the original article. Also, it should be noted that in the original article, the results of Wang et al. have been compared with the results obtained by using $\nu=0.3$ (Table 4 of [1]).

The discussion by Bambill et al. is again appreciated. Their analysis offers a sound and broad basis for the problem and should be pursued further.

Errata: the following corrections should be made to the original article:

Page 668, 6th line of abstract: should read "The effects of variation of Poisson's ratio,…" instead of "The effects of Poisson's ratio,…"

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0022-460X/$ - see front matter © 2010 Elsevier Ltd. All rights reserved.
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Page 670, 1st line: should read "In this paper, for plates with constant thicknesses selected terms from the complete sets of polynomials as in …" instead of "In this paper, for plates with constant thicknesses complete sets of polynomials as in …"

References

[1] S. Çeribaşı, G. Altay, Free vibration of super elliptical plates with constant and variable thickness by Ritz method, *Journal of Sound and Vibration* 319 (2009) 668–680.
[2] C.M. Wang, L. Wang, K.M. Liew, Vibration and buckling of super elliptical plates, *Journal of Sound and Vibration* 171 (3) (1994) 301–314.