ISAAC Conference, 23-27 April, 2007, Tbilisi, Georgia
Dedicated to the Centenary of I.Vekua

SOME PROBLEMS OF THE STRESSES CONCENTRATION FOR NON-SHALLOW CYLINDRICAL SHELLS ON THE BASIS OF I.VEKUA'S THEORY

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In his studies I.N. Vekua, by means method of the reduction of three-dimensional problems of elasticity to two-dimensional ones, constructed several versions of the refined theory of thin and shallow shells, containing the regular process [1].

Under thin and shallow shells I.Vekua meant three-dimensional shell-type elastic bodies, satisfying the following requirements

$$a_\alpha^\beta - x_3 b_\alpha^\beta \cong a_\alpha^\beta \Rightarrow x_3 b_\alpha^\beta \cong 0, -h\left(x^1, x^2\right) \le x_3 \le h\left(x^1, x^2\right) \quad (\alpha,\beta=1,2), \qquad (*)$$

where a_α^β and b_α^β are mixed components of the metric and curvature tensors of the middle surface **S** of the shell **Ω**, x_3 is the thickness coordinate, varying in the interval [-h,h], 2h is the shell thickness. Further, by expanding the unknown three-dimensional displacement and stress fields into the Forier-Legendre series and satisfying the boundary conditions on face surfaces $x_3=\pm h$ I.Vekua obtained the sequence of two-dimensional differential equations, contaning the regular process. Besides, it is evident that every sequence will contain the unremovable error which is generated by the assumption of the form (*). Therefore it is of great importance to get rid of this assumption.

The assumption of the type (*) means that the interior geometry of the shell does not vary in thickness and therefore such kind of shells are usually called the shells with non-varing geometry.

Under non-shallow shells will be meant elastic bodies free from the assumption of the type (*), or more exactly the bodies with the conditions

$$\left|x_3 b_\alpha^\beta\right| \le q < 1 \quad (\alpha,\beta=1,2). \qquad (**)$$

Such kind of shells are called shells with varing in thickness geometry, or non-shallow shells [2].

In the present paper we consider well-known problem of stress concentracion for non-shellow cylindrical shell. To solve the problems of plate and cylindrical shell algorithm of full automation is devised by means of the net method. The programme named VEKMUS is constructed [3]. By means of the programme the problems of stress concentration for shallow and non-shallow cylindrical shells are solved.

Literature

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