To Construction and Analogy of Mathematical Theory of Elastic Plates with Respect to Gödel's Incompleteness¨ Theorem

Tamaz Vashakmadze

tamazvashakmadze@gmail.com

Mathem.Dept., Javakhishvili Tbilisi St.University, University St.,2

"Gödel's incompleteness theorems are two theorems of mathematical logic that establish inherent limitations of all but the most trivial axiomatic systems capable of doing arithmetic. The theorems, proven by Kurt Gödel in 1931, are important both in mathematical logic and in the philosophy of mathematics. The two results are widely, but not universally, interpreted as showing that Hilbert's program to find a complete and consistent set of axioms for all mathematics is impossible, giving a negative answer to Hilbert's second problem. The first incompleteness theorem states that no consistent system of axioms whose theorems can be listed by an "effective procedure" (e.g., a computer program, but it could be any sort of algorithm) is capable of proving all truths about the relations of the natural numbers (arithmetic). For any such system, there will always be statements about the natural numbers that are true, but that are unprovable within the system. The second incompleteness theorem, an extension of the first, shows that such a system cannot demonstrate its own consistency" (Wikipedia).

The scheme of creating of a mathematical theory of elastic plates are same with above mention way of proofing "Gödel's Incompleteness Theorem".

1.**Statement with respect to incompleteness of refined theories of wide sense** The method of construction of refined theories and new analogous models (without simplifying hypothesis with arbitrary control parameters and having continuum capacity) were elaborated. The exact analytical expressions were found for corresponding remainder vector. Using those expressions and by applying new technology for error transition the unimprovable estimates were obtained, which represents the fact of negative invention. Many principal authors in this field (including Euler, Bernulli, Germen, Navier, Kirchhoff, Love, Filon, Poincare, von K?rm?n, Timoshenko, Reissner, Henky, Mindlin, Goldenveiser, Landau, Donnel, Vorovich, Vekua, Koiter, Naghdy, Ambartsumian, Vashicu, Lucasievich, Antman, Ball, Ciarlet,Podio Guid-Ugli, Destuynder,)assumed that their theories gave an approximation (in physical, geometrical, asymptotical or other meanings) to initial 3D BVP for thin-walled structures of theory of elasticity, but there are proved that the transition error for each one from finite theories is bounded from below.

2.**Statement with respect to completeness of theories constructing by regular processes** Considered are regular processes when on surfaces of plates the linear form of stress tensor and displacement vector are given. For justification of Kantorovich-Vekua type methods:the problems of limited density, of basis property of Jacobi polynomials is studied and for remainder members of Fourier-Legendre series synchronous exact estimates with respect to a thickness h and N-number of approximation are given. For BVP of corresponding systems DEs: i) $N \leq \infty$ there are truly Korn's type inequalities, ii) for the transition error in Sobolev's space of functions exact estimates with respect to h and N are obtained and the convergence of corresponding processes is proved, iii)there are constructing Rutishauser or Gauss types operator factorized schemes by means of which an approximate solution for any $N < \infty$ can be found.