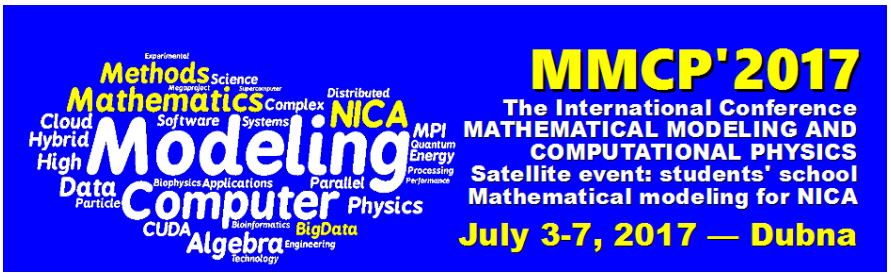

Contribution ID: **34** Type: **not specified**

High-Accuracy Finite Element Method for the 2D Parametric Elliptic Boundary-Value Problems

Thursday, 6 July 2017 14:30 (15 minutes)

High-accuracy finite element method for solving the 2D parametric elliptic self-adjoint boundary-value problems is presented. The triangular elements and new high-order fully symmetric Gaussian quadratures with positive weights, and no points are outside the triangle (PI type) is applied. The program calculates with the given accuracy the eigenvalues, the surface eigenfunctions and their first derivatives with respect to the parameter of the BVP for parametric self-adjoint elliptic differential equation with the mixed Dirichlet-Neumann type boundary conditions on the 2D polygonal domain, and the potential matrix elements, expressed as integrals of the products of surface eigenfunctions and/or their first derivatives with respect to the parameter. We demonstrated an efficiency of finite element schemes and program by means of benchmark calculations the 3D boundary-value problem for Helium atom bound states in the framework of Kantorovich method.

Primary author: VINITSKY, Sergue (BLTP JINR)

Co-authors: Dr GUSEV, Alexander (Laboratory of Information Technologies Joint Institute for Nuclear Research); Mr CHULUUNBAATAR, Galmandakh (ЛИТ); Dr CHULUUNBAATAR, Ochbadrakh (LIT JINR)

Presenter: VINITSKY, Sergue (BLTP JINR)

Session Classification: Computer Algebra and Quantum Computing with Applications (I)