

Development of methodology and Networked simulating tools with orientation on micro electromechanical systems (MEMS) (Project of The Science and Technology Centre in Ukraine (STCU))

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The main project goals are significant expansion of Micro-Electro-Mechanical Systems (MEMS) and VLSI circuits types, which could be designed automatically, and design efficiency improvement due to the use of new methodology and general networked toolkit for MEMS simulation.

Modern existing methodology of MEMS design confirms that MEMS can be only investigated at the higher abstraction levels such as schematic and system levels for which still accurate macromodels can be used and that components related physical phenomena described by PDE could be solved using FDM or FEM. More valuable solution is to automatically generate above mentioned macromodels by extracting the necessary information from the detailed components finite element models which have been built at the earlier design stages. This can be done by using model order reduction techniques which use Krulov-Arnoldi method of moments (CoventorWare codes) or mode solution decomposition (ANSYS). Then complete behavioral model of the whole MEMS can be compiled in VHDLAMS language as a system of ordinal differential equations.

New alternative approach is proposed in this project. It is based on the creation of schematic representation of FEM equations and subsequent reducing of acquired schematic with aid of modified Y- Δ transformation procedure by useless nodes removal. It allows the direct usage of existing schematic ALLTED input interface. Chair partners on both STCU projects are Information Registration Problems Institute NASU and Open jointstock company «Scientific industrial complex «Kurs» of a part of «Kyivsky RadioPlant».