Information Models Development for Mems Analysis Subsystem Based on Stochastic Petri Nets

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Abstract - **Information models for MEMS structures analysis and research subsystem based on Petri nets theory are designed.**

Keywords - **MEMS, Petri Nets, information technology.**

I. INTRODUCTION

Integration of scientific and technological achievements enables emergence of new interdisciplinary domains like the following ones: micro electro-mechanical systems (MEMS) [1], nanoelectronic devices, micro opto-electrical systems etc. Dynamic development of such interdisciplinary domains is impossible without introduction of modern information technologies (IT) into process of analysis, synthesis, study and design of new integrated devices and systems. The core of the information technology of MEMS analysis and synthesis must be the new methodology, methods, models, approaches, algorithms and software [1, 3]. For analysis of developed MEMS on the upper levels of abstraction in several papers [4-6] models based on Petri nets and their variations (timed, colour, stochastic, with priorities etc) are used. Therefore the task of development of information models for MEMS analysis based on Petri nets is actual one.

II. DEVELOPMENT OF INFORMATION MODEL OF SPN BASED ON DOUBLE-ENDED LISTS

For the internal representation of schematic model (Petri net) we use data structure based on the following information model: $Net - stoxastik = (Z, V, P, D)$, where Z is the header of SPN (general information), V is the finite set of places and their parameters, P is the finite set of transitions and their parameters, D is the finite set of arcs and their parameters. To store SPT during software realization we used double-ended list structures.

III. DEVELOPMENT OF INFORMATION MODELS FOR PETRI NETS STORING

Subsystem of stochastic Petri nets analysis (SASPN) StohasticPetriNet allows user to write down data into the file and retrieve information about SPN from output file and to present in the working area of subsystem. Input data should be written into the file with "*.net" extension. Besides the user can type parameters of the given PN into the file and organize effective data exchange with other systems of models synthesis based on PN (schematic models), their modifications or analysis. Structure of the working file consists of header, list and format of places, list of transitions, arcs and their formats.

IV. DEVELOPMENT OF INFORMATION MODELS OF PETRI NET PROCESSING JOURNAL

In general case the real SPN is made up of hundreds of places, transitions and arcs. Therefore to control and analyze such model is rather hard. To simplify the process of analyze we propose to save results of the net processing in the form of journal with the possibilities of data analysis. Storing of the net processing is done with the assistance of information model (fig.1) which includes information on date of enabled transition, time, code of transition, generated values of probability (GVP), given probability of firing (GPF) and results (has transition fired or not). Data structures are processed with certain software tools.

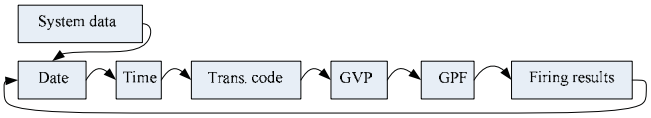

Fig.1. Information model journal structure

V. CONCLUSIONS

Information model for storing data on SPN based on double-ended lists enabling comfortably and rapidly fulfill the modification of Petri nets as well as information model for data storing in the output file of SPN analysis results are developed.

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