AN EXPERIMENTAL FRAME SPECIFICATION MODULE

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The purposes for which the simulation study is undertaken strongly influence the model development process. However, there is no formal methodology to link the model objectives with the model structure and in practice critical choices are based on intuitions and are made without the benefits of theoretical guides and checks.

The objectives of modelling can be expressed as a formal object called an experimental frame, i.e., the specification of circumstances under which the model is to be observed and experimented with (Zeigler 1984). A frame basically consists of sets of variables and contraints on their trajectories. A software tool for experimental frame development - EXP - is being developed. Such a tool is intended to be helpful in such procedures as: building a frame, interfacing frame variables with model variables, checking for for consistency and completeness of their coupling.

Together with Entity Structuring Program - ESP - (Zeigler 1980), an interactive software tool to conceptualize and record the decompo- sitions of entities underlying a model or a family of models, EXP is a crucial step in achieving model/experimental frame modularization. With these two tools, one is able to organize models and experimental frames. ESP encodes systems entity structure that is the set of decompositions and components of a particular system. Then, with the help of EXP, one specifies the experimental frames using the variables pertaining to entities as well as creating new ones. A model of an entity can be constructed by connecting together some or all the components of the aspect of the entity. Those components specify the model and point out to all experimental frames already determined by EXP. The idea of a model construction process is depicted in Fig. 1. The requirements for consistency between frame and model variables are defined. The outline for the design of the ESP/EXP interface is also presented.

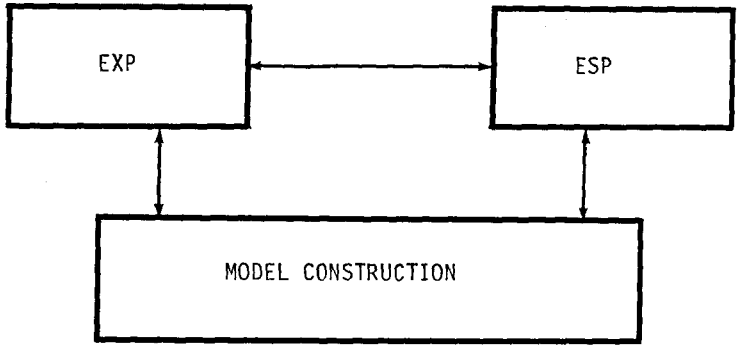

Figure 1. Model Construction Process.

An experimental frame is specified as a five tuple EF=<I, O,IS,RC,RCS,SU> where I is the set of input variables, O set of output variables, IS set of input segments, RC set of run control variables, RCS set of control segments and SU is the set of summary variables.

EXP has been constructed in the form of an interactive program written in PL/1. The finite automata formalism was employed to advantage in its design. EXP is represented as an automaton A=<X,Y,Q,DEL,LAM> where X is the set of user specified commands, Y is the set of actions resulting from a particular command and the state Q that the program is in. The transition function DEL as well as the output function LAM are given in the form of matrices. The actions concern such operations as restoring frames, displaying a frame or its components. There is another mode of operation which allows similar activities on chosen frame components e.g., on the set of input variables. Each action module is described in terms of "O" and "V" functions (Parnas 1972). Such an approach of design leads to a system which has good error detection and correction capabilities.

EXP is still being developed. New features such as testing for the variables consistency, improved user/program interface and error flexibility will be added. The interface coupling EXP with ESP is being designed as well. For more details see (Rizkl, Rozenblit 1982).

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