Faculty of Electrical Engineering & Computer Science
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Development of a Distributed Simulation Environment with Ethernet Linked Computers to Reduce Calculation Time of Simulations.

ABSTRACT - Masterthesis

Due to the fact that models of dynamic systems are becoming more detailed, more time is required until the simulation results are available. For reducing the time taken for simulation, a distributed simulation environment of several computers should be used. Each computer system should simulate a part of the whole model to increase the calculation power. For easier implementation a Matlab/Simulink model will be split into smaller parts and exported to C- Code. This C-Code should be compiled and loaded by a server or client depending on the model. For example, a power grid would be simulated on the server, while loads or wind energy plants should be simulated by the clients.

The aim of the thesis is to distribute the simulation load to several computers linked with Ethernet and reduce the calculation time. For achieving this, a server and multi-client programs have to be implemented using TCP/IP protocol. The libraries should be created based on the models exported from Matlab/Simulink and are to be loaded on both server and client sides. The structure variables from C are to be parsed using Clang tool for data exchange between server and clients. Programs have to be developed for automatic packet creation and size calculation for each data exchange based on the model's C-structures. After a successful communication system is implemented, the time measurement for execution of the models and transfer of the data at 100 MBit/s connection is to be recorded and evaluated. Finally improvements have to be made for the usability of the programs and the simulation models.