Karlsruhe Institute of Technology

ENERGY LAB 2.0

ESA

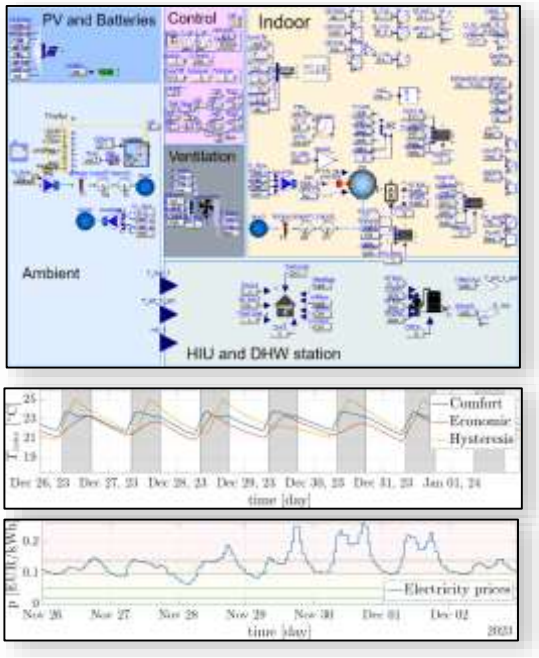
Institute for Automation and Applied Informatics (IAI)

Master Thesis

Flexible Fuzzy Energy Management System for Building Model

With the increasing demand for residential comfort and the promotion of energy conservation and emission reduction policies and concepts, it has become a challenge to find a balance between residential comfort, economy and sustainability in residential buildings. Advanced energy management system (EMS) is one of the feasible solutions to achieve this goal.

This thesis will develop a flexible, fuzzy energy management system for an existing modular building model. The building model, modeled in the Modelica language, contains several sub-modules, including different heating and electrical equipment. The design of the EMS needs to be able to coordinate these functional modules in order to optimize energy consumption and heating costs etc.



Tasks:

- Analysis of the existing building model and EMS frameworks
- Analysis and design of a flexible Fuzzy EMS for Winter (and Summer) Scenario for Cost, Energy or CO2 minimization
- Investigation of possible interfaces for integration of EMS in building model (FMU-Python Interface) with an easy to use Interface for exploring various parameter settings
- Comparison with a standard EMS system

Qualification :

- Solid knowledge in energy system analysis, building modeling & control
- Knowledge in Python
- Enrolled in Mechanical/Electrotechnical/Informatics Faculty

We offer:

- Excellent support from the ESA group and experts at the EnergyLab
- Use of the HW and SW in the EGSAL Lab at the EnergyLab of KIT-CN
- Thesis can be held in German or English

If you are interested in the topic, please contact Jovana Kovacevic or Haozhen Cheng.

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