Paid Master's Thesis

Development of Thermo-Hydraulic Simulation Models for Thermal Energy Systems

To dedicated students (m/w/d) of electrical / mechanical / digital / information and computer engineering or related disciplines, we offer the opportunity to write a paid Master's thesis. The thesis will be conducted in cooperation with the Institute of Automation and Control, Graz University of Technology.

Motivation:

Simulation is a crucial element of any controller design. Over the past years, a modular framework for an optimization-based, predictive supervisory controller has been developed which orchestrates production, storage and consumption in various types of multi-energy systems. It operates by automatically formulating and solving optimization problems for a model-predictive controller. Simulation models are now needed to evaluate the results.

For this purpose, a *ModelingToolkit.jl*-based library of components (thermal energy storage, boiler, pumps, valves, pipes, …) should be developed and combined into a modular simulation framework.

Objectives:

- Get to know *ModelingToolkit.jl* and build first simple models
- Implement different thermo-hydraulic models such as thermal energy storages, pipes, pumps, valves, etc. in *ModelingToolkit.jl*
- Combine those models to represent typical energy systems of single-family homes
- Build a simulation framework for co-simulation of your system model with the existing optimization-based predictive supervisory controller

Your profile:

- Studies in electrical, mechanical or computer engineering or physics
- Ideally with some background in control engineering
- Programming experience with MATLAB, Python or (ideally) Julia

Our offer:

- Integration into a dedicated team
- Perspective of participation in follow-up projects after successful completion
- Financial compensation based on student staff salary scheme
- Provision of a work place (remote work from home also possible)

In the interest of diversity, applications from women are especially welcome at BEST!

Contact us:

Dipl.-Ing. Dr. Markus Gölles
BEST - Automation and Control
markus.goelles@best-research.eu
Tel.: +43 5 02378 – 9208

Univ.-Prof. Dipl.-Ing. Dr. Martin Horn
TU Graz – Inst. of Automation and Control
martin.horn@tugraz.at
Tel.: +43 316 873 -7025

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