Karlsruhe Institute of Technology

ENERGY LAB 2.0

Institute for Automation and Applied Informatics (IAI)

Earliest start: from 01.01.2024

Bachelor-/Master thesis

Identification of dynamic greybox models for the control of a power-to-methanol process

Key Words: PtX, Greybox models, system identification, modeling

In order to reduce climate-damaging greenhouse gas emissions, the German energy transition is increasingly focusing on renewable energies and alternative fuels such as e-fuels. The international research project "UP-TO-ME" is working on the development of a new type of power-to-methanol process in which green methanol is produced from electricity from renewable energies and carbon dioxide as a fuel for ships. A container-sized test plant is currently being put into operation in the Energy Lab at KIT Campus North.

Precise control of the process is required for efficient operation of the test plant at KIT. This requires the identification of control models for various sub-processes of the power-to-methanol plant. We are looking for a committed and motivated bachelor or master student. The tasks include carrying out simulations with process engineering software to obtain data and identifying control engineering (greybox) models to control the process. Initial measurement data from the test plant can also be included in the model identification. The exact topic can be individually adapted or agreed upon. The thesis can be written in German or English.

Tasks:

- Literature research on the current state of the art
- Carrying out simulations to obtain relevant data
- Development and identification of grey box models
- Evaluation of the models

Education, experience and skills:

- Field of study: mechanical engineering, mechatronics, computer science, electrical engineering (or similar)
- Basic knowledge of Matlab and/or Python
- High motivation and ability to work independently

For further information please contact:

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