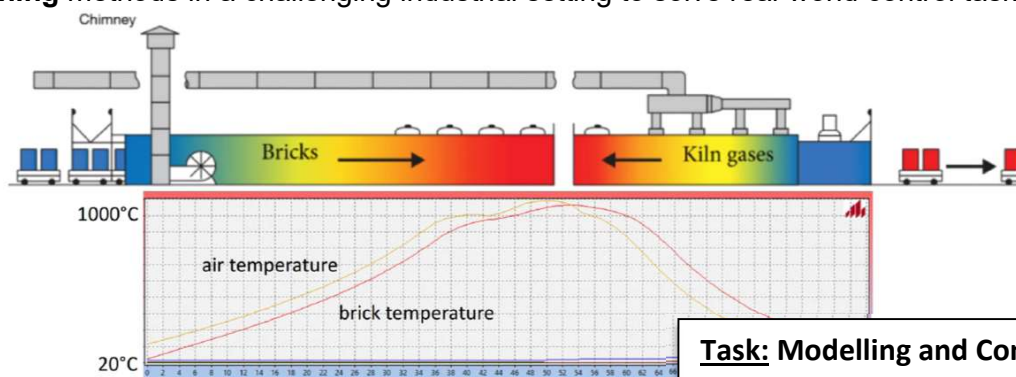


The Institute of Mechanics and Mechatronics is located at the Faculty of Mechanical and Industrial Engineering of the TU Wien. Our research team is made up of graduates from a wide range of disciplines such as mathematics, physics, mechanical engineering and industrial engineering. Within the framework of research cooperations with industrial partners, we conduct application-oriented basic research with a focus on modelling, optimisation, simulation and control engineering.

Master Thesis in Control Engineering Research Project

The **Institute of Mechanics and Mechatronics (IMM)** and the **Institute of Information Systems Engineering (IISE)** at TU Wien invite applications for a Master Thesis within the **FurnAlce** research project. The research focuses on **AI-enhanced modeling and control** of tunnel kilns to improve **energy efficiency and sustainability** in brick production. The topic seeks to combine **modern control engineering** and **machine learning** methods in a challenging industrial setting to solve real-world control tasks.



Task: Modelling and Control of a Tunnel Kiln for Brick Production

Your profile:

- Advanced undergraduate studies in **mathematics, physics, engineering**, or related fields.
- Solid background in **system theory, modeling, and control**.
- Beneficial prior experience:
 - **advanced control (LQR, MPC), experimental (data-based) modeling, simulation, machine learning**
 - **programming (MATLAB, Python)**
- **Motivated to learn & do research in a real-world industrial setting**, with a structured approach.

Potential work / thesis aspects (a detailed work planning will be done individually with the supervisor):

- On-ramping into the team & research topic (overview/big picture, literature studies)
- **Develop a reduced-order model** of the tunnel kiln dynamics (based on existing models) for control purposes.
- Review and prepare **real-world measurement data** of a selected tunnel kiln.
- **Parameter identification** of the model via measurement data to obtain a calibrated tunnel kiln model.
- Design a baseline controller (e.g. **LQR, model-predictive control**) for specific kiln operation goals.
- Evaluate model quality and closed-loop performance via test cases in **detailed co-simulations**.
- Assess and **explore potential model extensions** by e.g. AI-based components to improve model quality where needed.
- Clearly **document** findings, program code and results.
- **Scientific publication** of the results is foreseen.

Institute of Mechanics and Mechatronics

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