

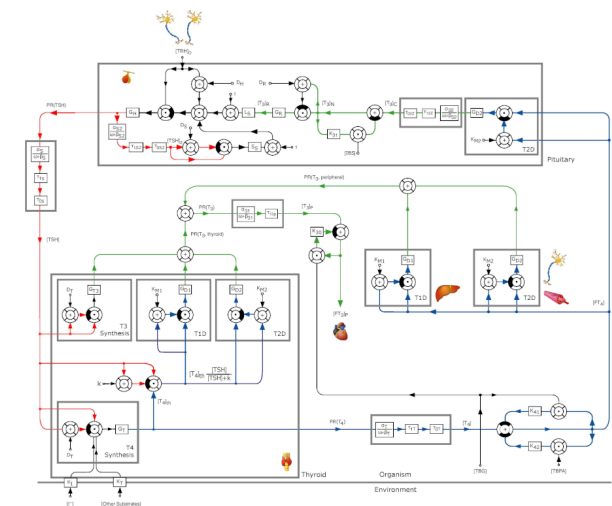
## Masterthesis

# Modelling, analysis and control of the pituitary–thyroid feedback loop

The pituitary–thyroid feedback loop plays a key role in human hormone homeostasis. A detailed understanding of its functionality is crucial in order to treat and cure various endocrine diseases. The goal of this thesis project is to extend and further analyze recently developed mathematical models of the pituitary–thyroid feedback loop. This includes, e.g., the incorporation of so far unmodelled phenomena such as, e.g., membrane transporters or the enterohepatic circulation.

Particular tasks for a thesis include a detailed literature search, an implementation in Matlab / Simulink including parameter estimation, and a detailed systems-theoretic analysis of the developed model, including sensitivity analysis. The long-term goal of this project is the development of optimal medication strategies for the treatment of various endocrine diseases such as, e.g., Graves' disease.

**Requirements:** Good skills in Matlab & Simulink, Background in Biomedical Engineering and Systems Biology, Background in Control (e.g. lectures Regelungstechnik I & II)



## Contact

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