

Oxygen Buffer Modelling and Control for a Three Way Catalyst

Background

At Aurobay, we power the future with sustainable engines and hybrid solutions. To make our work more efficient we develop model-based control and estimation algorithms largely by modelling observable physics. Traditional catalyst control normally consists of a binary lambda sensor switch type feedback control which has proven to be robust and efficient. However, a model based control function has potential to improve the system performance by utilizing the complete catalyst volume in an optimal way. Numerous articles have proposed different modelling and control approaches. This thesis aims to apply some of those techniques using real-world data and real-world emission systems in vehicle.

Objectives

- Scan the proposed modelling/control approaches documented in literature
- Implement a few of the approaches in Matlab/Simulink
- Conduct experiments in engine/vehicle test bench to collect data for optimization
- Optimize the models and chose one for implementation in vehicle SW
- Design and implement a modelling/control strategy in vehicle SW
- Evaluate the model with emission tests in a real-world application
- Summarize benefits and drawbacks compared to the traditional approach

Activities

- Literature study
- Model development in Simulink
- Model and control optimization
- Engine and vehicle tests

Micellaneous

- Scope of work is suitable for two students
- Engine/vehicle tests to be performed at Aurobay, Gothenburg
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