



Palais des Congres de Versailles, Franwww.modelica.org

Tutorial Session

Optimal Control and State Estimation with Modelica and Optimica

Contents

- 1 License Information
- 2 Introduction
- 3 Installing and starting OCT/JModelica.org and running Python Scripts
- 4 Exercise 1. Offline Optimization: Start-up of a Continuously Stirred Tank Reactor
 - 4.1 Compile and instantiate a model object
 - 4.2 Solve the DAE initialization problem
 - 4.3 Solving an optimal control problem
 - 4.4 Verify optimal control solution
 - 4.5 Additional exercises
- 5 Heat Recovery Steam Generator
 - 5.1 System overview
 - 5.2 Start-up Optimization Problem Formulation
 - 5.3 Models
- 6 Exercise 2. Offline Optimization: Start-up of a Heat Recovery Steam Generator

- 6.1 Generate Initial Operating Point and Initial Guess by Simulation
- 6.2 Solve Offline Optimization
- 6.3 Backtracking from Residuals to Equations
- 6.4 Additional Exercises

7 Exercise 3. Non-linear Model Predictive Control: Start-up of a Heat Recovery Steam Generator

- 7.1 Introduction
- 7.2 Generate Initial Operating Point and Initial Guess by Simulation
- 7.3 Setting up the NMPC Object
- 7.4 Running the NMPC Loop
- 7.5 Soft Constraints Reformulating Optimization Problem
- 7.6 Additional Exercises
- 8 Exercise 4. Moving Horizon Estimation: Start-up of a Continuously Stirred Tank Reactor
 - 8.1 Load Optimization Results
 - 8.2 Compile and Load the Models
 - 8.3 Choose MHE Setup
 - 8.4 Run the MHE Loop
 - 8.5 Plot the Results
 - 8.6 Additional Exercises
- 9 Tutorial Evaluation
- 10 Bibliography