

## A tuning approach for offset-free MPC with conditional reference adaptation - DTU Orbit (08/11/2017)

### A tuning approach for offset-free MPC with conditional reference adaptation

Model predictive control has become a widely accepted strategy in industrial applications in the recent years. Often mentioned reasons for the success are the optimization based on a system model, consideration of constraints and an intuitive tuning process. However, as soon as unknown disturbances or model plant mismatch have to be taken into account the tuning effort to achieve offset-free tracking increases. In this work a novel approach for offset-free MPC is presented, which divides the tuning in two steps, the setup of a nominal MPC loop and an external reference adaptation. The inner nominal loop addresses the performance targets in the nominal case, decouples the system and essentially leads to a first order response. The second outer loop enables offset-free tracking in case of unknown disturbances and consists of feedback controllers adapting the reference. Due to the mentioned properties these controllers can be tuned separate and by known guidelines. To address conditions with active input constraints, additionally a conditional reference adaptation scheme is introduced. The tuning strategy is evaluated on a simulated linear Wood-Berry binary distillation column example.

### General information

State: Published

Organisations: Department of Applied Mathematics and Computer Science , Scientific Computing, Department of Chemical and Biochemical Engineering, Centre for IT-Intelligent Energy Systems in Cities, Johannes Kepler University of Linz

Authors: Waschl, H. (Ekstern), Jørgensen, J. B. (Intern), Huusom, J. K. (Intern), Del Re, L. (Ekstern)

Pages: 3062-3067

Publication date: 2014

### Host publication information

Title of host publication: Proceedings of the 19th IFAC World Congress

Publisher: International Federation of Automatic Control

ISBN (Print): 978-3-902823-62-5

Main Research Area: Technical/natural sciences

Conference: 19th World Congress of the International Federation of Automatic Control (IFAC 2014), Cape Town, South Africa, 24/08/2014 - 24/08/2014

Model predictive, Optimization-based control

DOIs:

10.3182/20140824-6-ZA-1003.02369

Source: FindIt

Source-ID: 2288854873

Publication: Research - peer-review › Article in proceedings – Annual report year: 2015