Nonlinear Control and Estimation for Industrial Processes

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1 Abstract

We present a framework for online nonlinear dynamical modeling and optimization. This allows, in particular, to formulate and directly solve control problems, state estimation problems, and parameter estimation problems for relatively slow industrial processes. Although formulating these problems is straightforward, care has to be taken to enable the solver (in our case IpOpt [**?**]) to deliver robust and efficient solutions. The highlights of the presentation are the following:

- We show how the way the optimization problems are formulated affects the speed and robustness of the solution [**?**]. In particular, the importance of variable elimination is pointed out.
- When parameter estimation is used together with non-zero state noise, a problem of biasedness of the estimators arises. We discuss how to deal with this, based on [**?**].
- A case study of state and parameter estimation of a coal mill for a coal fired power plant is presented.
- A case study of model predictive control of the coal mills in a coal fired power plant is presented, taking into account online condition monitoring of the mills' status and according optimal load scheduling to the mills.

References

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