

Optimizing gas lifted oil wells

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Introduction and background:

Over time the pressure in oil wells decreases. It is the pressure that derive the oil to the oil platform. This result in decreasing oil production

Gas lifted oil wells is a technique to increase oil production of wells where pressure over time has decreased. By injecting gas into the tube, the density will decrease and the oil will flow easier to the oil production platform.

It is limited capacity of injection gas at a platform and several gas lifted oil wells. Therefore, it is necessary to ensure that the gas injected gives maximum oil produced.

Due to lack of measurement in the wells, good models are essential to describe the different wells. Then a model predictive control (MPC) can be introduced.

Problem description and objective:

Models used today are nonlinear models. When using these models into nonlinear MPC the computational time is high.

To decrease the computational time the nonlinear models should be linearized and then linear MPC can be used instead. The MPC must also handle uncertainties.

The objective is to develop a multistage linear robust MPC that can optimize the gas injection of several wells to maximize the total oil production.

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