

## Explicit model predictive control applications in power systems: an AGC study for an isolated industrial system - DTU Orbit (08/11/2017)

### Explicit model predictive control applications in power systems: an AGC study for an isolated industrial system

Model predictive control (MPC), that can consider system constraints, is one of the most advanced control technology used nowadays. In power systems, MPC is applied in a way that an optimal control sequence is given every step by an online MPC controller. The main drawback is that the control law cannot be evaluated before the MPC controller is put into service. Therefore, system operators may not validate its performances in advance. To overcome this drawback, the explicit MPC (EMPC) method is introduced and applied to obtain an explicit control law. In addition, another major contribution is that an improved partition algorithm of EMPC is studied which enables the EMPC method to be extended to a system of large number of state variables and more constraints. A simple single generator single load case is used to illustrate the whole procedure of EMPC and then the EMPC is applied to an actual isolated power system for frequency control. Simulation results show that the explicit control law of EMPC is able to restore system frequency to its nominal value under large disturbance. Moreover, the physical meaning of the explicit control law given by EMPC can be clearly explained for the studied system.

#### General information

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