Contribution ID: **1061**   Type: **Poster Presentation**

C3Po1A-08 [17]: Control of Warm Compression Stations Using On-line Model Predictive Control (MPC): Experimental Results

Wednesday, 24 July 2019 09:00 (2 hours)

This paper deals with multivariable on-line model predictive control (MPC) for helium Warm Compression Stations (WCS). During WCS operation, control algorithms must ensure that the constraints are respected. These constraints can be imposed by the system itself (valves open from 0 to 100 %, compressor maximum current and pressure, ⋯), or imposed by the users (valves which must remain closed or open to a minimum other than 0, pressures which should not be too low or too high). The MPC controller takes into account the constraints and set points into one optimization problem, which makes it the ideal candidate to control the WCS. The papers presents experimental results obtained on the SBT WCS, showing that the WCS is running safely while taking into account the constraints. The experimental tests shows that using MPC leads to high stability and fast disturbance rejection such as those induced by a turbine or a compressor stop, which is a key-aspect in the case of large-scale cryogenic refrigeration. The proposed control scheme can be used to achieve precise control of pressures in normal operation or to avoid reaching stopping criteria (such as excessive pressures) under high disturbances (such as the pulsed heat load expected to take place in future fusion reactors).

Primary authors: Mr PHAM, Xuan huy (cea); Dr BONNE, François (CEA/SBT); Dr ALAMIR, Mazen; Mr BONNAY, Patrick (CEA/SBT); Mr ATTARD, Anthony (CEA)

Presenter: Mr ATTARD, Anthony (CEA)

Session Classification: C3Po1A - Applications: Instrumentation and Controls