



Contribution ID: 9

Type: **not specified**

Model Predictive Control applied to the LHC magnets temperature control

The LHC superconducting magnets are operated below a temperature of 1.9 K along a circumference of 27 kilometers. The temperature of these magnets is a control parameter with very strict operating constraints. The presentation addresses the different approaches taken to overcome the complexity of the process and introducing a nonlinear control approach based on a predictive control technique which includes a constrained nonlinear state estimator with a receding horizon estimation procedure to improve the regulator predictions.

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