Model Predictive Control of Pilot Spray Dryer Unit designed and implemented for an educational institute

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Model Predictive Control of Pilot Spray Dryer Unit designed and implemented for an educational institute' is an effort to build an experimental set-up for demonstrating the spray dryer technology and the advanced process control strategy for the same to students. During last few decades spray drying has become highly competitive way of drying a wide variety of products. It has gained paramount importance in making powder from the extracts of seasonal fruits, milk, egg etc. in large quantities. The objective of building the proposed Pilot Plant is to provide a platform on which students can perform experiments by operating the plant and observing the effects of variation of different process parameters and load disturbances. It works on the principle of co-current pneumatic nozzle spray dryer. Evaporation of moisture in spray-droplets is accomplished by its direct contact with hot whirling air co-currently under the controlled conditions of temperature and airflow. The plant is built and operated using local instruments and PID controller, which receives set point from the DCS in the control room. The plant model is developed, simulated and tested using software tools. The tested model is then implemented using MPC block in the EMERSON deltaV DCS which generates the optimized set points for the field mounted regulatory controller. Various trials and experiments are conducted to compare the performance of the control system with and without Model Predictive Control.

Keywords: Model Predictive Control, Advanced Control for Spray Dryer, Pilot Spray Dryer Control for Educational Institute, Educational set-up of Model Predictive Control

Note: deltaV is a trademark/brand name of Emerson Process Management, USA.

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