

Plant simulation, visualization and control platform based on OPC and Simatic WinCC

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Abstract

Automation and control engineers in industry engage in the process monitoring and development of control systems for existing plants, the design and test of different control philosophies is essential in this process.

One of the visible ways to test the control logics could be to build a simulation platform with a model which mimics the real plant behavior as close as possible, this model can be monitored and controlled with different control schemes.

This paper presents a method of developing a rapid simulation platform for process monitoring and control with the communication based on OPC. A mathematical model of a platinum refining reactor is developed with MATLAB and Simulink S-Function blocks, this communicates its process input and output variables through an OPC interface of SICAM PAS/PQS gateway. The process variables and phases are visualized dynamically and controlled automatically either with control logics or by operator intervention in SIMATIC WinCC.

A simulation platform is presented, where a series of control simulations can be carried out using a Monte Carlo technique with varying input variables. The test results show that the exchange of remote real-time data can be attained between plant model in MATLAB and Simatic WinCC or any other commercial software using OPC interface within SICAM PAS. An effective and feasible communication protocol between MATLAB and WinCC can be achieved. The plant's process phases can be monitored, and the temperature of the reactor can be controlled during a simulation of the process.

A generic step by step method of developing a communication interface between the model and control interface is described.