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Nonlinear Model Predictive Control of an Industrial Polymerization Process

Abstract:

Nonlinear model predictive control (NMPC) is used to maintain and control polymer quality at specified production rates because the polymer quality measures have strong interacting nonlinearities with different temperatures and feed rates. Polymer quality measures that are available from the laboratory infrequently are controlled in closed-loop using a NMPC to set the temperature profile of the reactors. NMPC results in better control of polymer quality measures at different production rates as compared to using the nonlinear process model with reaction kinetics to implement offline targets for reactor temperatures. A Linear Model Predictive Controller (LMPC) will not be able to achieve the process objectives because there are strong nonlinear dependencies for polymer quality attributes with reactor temperatures and feed.

Biography:

Dr. Rahul Bindlish is a technology expert in the Engineering Solutions Technology Center at The Dow Chemical Company, leading the technology development and implementation of model predictive controllers and on-line optimizers. He has eighteen years of experience in leading advanced control and optimization projects in different businesses to create significant value for Dow. He has a Ph.D. in Chemical Engineering from University of Wisconsin-Madison for his research on Nonlinear Model Predictive Control of Polymerization Processes. He has served as the chairperson on the Aspen Advanced Control & Optimization Users' Group Board, and is a certified Six sigma black belt.