Next Generation Regulatory Controller for Chemical Processes

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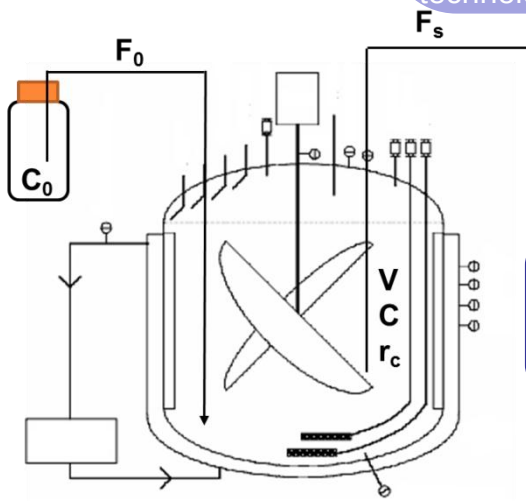
Meeting the stringent demands on manufacturing processes in the 21st century effectively requires a fundamentally re-imagined alternative next generation regulatory controller that takes proper advantage of modern digital electronic technology to overcome the weaknesses of current PID controller technology

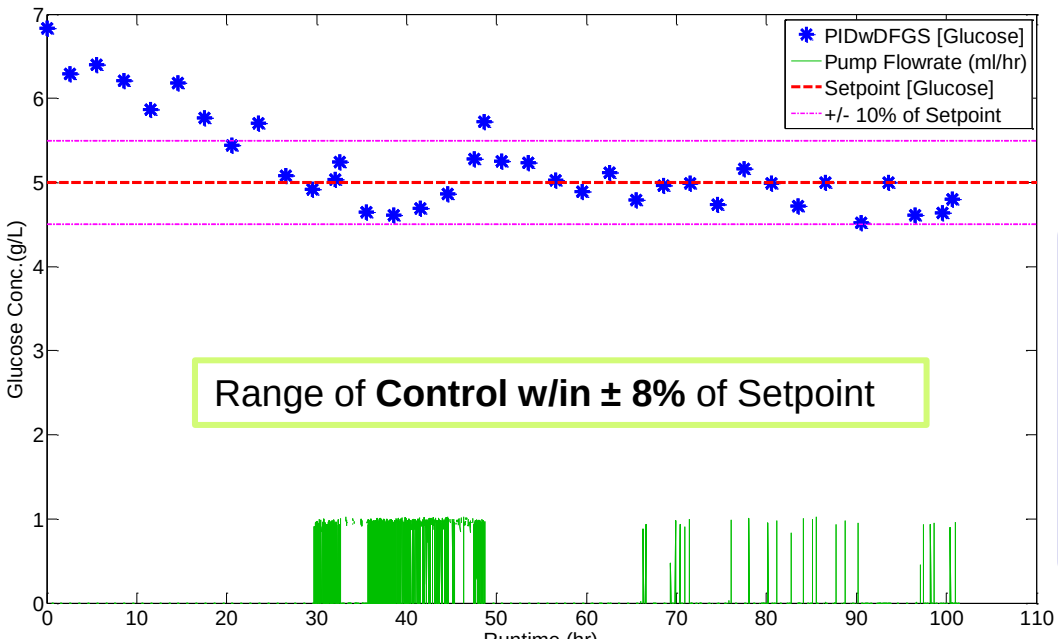
Parallel Bioreactor System
(DasGip, Jülich Germany)

OPC

BioAnalyzer (Nova Biomedical, Waltham MA)



Application on a parallel bioreactor system for making monoclonal antibodies



Range of **Control w/in ± 8%** of Setpoint

The bioreactor is integrated through an OPC interface with a bioanalyzer (Nova Bioprofile 100+) that provides measurements of the metabolites. The performance of our regulatory control strategy has been demonstrated specifically as follows: Chinese hamster ovary (CHO) K1 cells were cultured in serum free suspension culture with 30% DO and pH 7.3 and glucose and glutamine media concentrations measured at 3-hour intervals over the course of a single 110-hour experiment. The first 30 hours were carried out without control; during the final 80 hours, our control algorithm was used to maintain glucose nutrient concentration at desired set-point. The results show that the controller maintained glucose concentration within 8% of the set-point, exceeding the industry standard objective of ± 10% (which are difficult enough to achieve).