

145a Modeling, Analysis and Tuning Tools for Teaching Process Dynamics and Control

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Instructional tools for process dynamics and control should be visually appealing, easy-to use and accepted by students and practitioners. Loop-Pro is software designed to meet these goals so students will: - learn how to collect and analyze process data to determine the essential dynamic behavior of a process, - learn what "good" or "best" control performance means for a particular process, - understand the computational methods behind the different control algorithms and learn when and how to use each one to achieve best performance, - learn how the different adjustable or tuning parameters required for control algorithm implementation impact control performance and how to determine values for these parameters, - become aware of the limitations and pitfalls of each control algorithm and learn how to turn this knowledge to their advantage.

Loop-Pro is comprised of three modules: Case Studies, Custom Process and Design Tools. The Case Studies module provides real-world experience in modern methods and practices of process control through a collection of realistic processes to practice upon. The Custom Process module is a block oriented environment that lets students construct a process and controller architecture to their own specifications for a wide range of custom control analyses. The Design Tools module is used to fit linear dynamic models to process data and to compute PID controller tuning values. The models from Design Tools can also be used to construct advanced control strategies that use process models internal to the controller architecture such as feed forward and model predictive control.

This paper explores the use of the Control Station training simulator for process control education. In particular, the discussion focuses on how this simulator bridges the gap between textbook theory and laboratory learning. Methods and benefits of using Control Station in the undergraduate curriculum are presented. Control Station is currently used by more than 150 universities and colleges worldwide.