

PRONAMICS CONTROL INC

Your technical resource for improving process and control performance

Process Optimization and Troubleshooting Techniques

Ways to Improve Productivity and Quality and Reduce Costs

June 22-25, 2010
Edmonton, AB

COURSE TOPICS:

Process Variability
Process Dynamics
Tuning PID Controllers
Attenuating Disturbances
Troubleshooting Loop Problems
Impact of Process Design
Identifying Process Variability
Managing Process Variability

High process variability compromises the economic performance of continuous processes through off-quality product, higher raw material costs and reduced process efficiency. Minimizing process variability is a difficult, multi-disciplinary activity that extends from the process design engineer to the operator. Process design flaws, poor control loop performance and inadequate tank mixing are important factors that lead to high variability in key process variables. Moreover, there is often a lack of the troubleshooting skills required to identify and correct variability problems. This allows high levels of variability to persist for an extended period, compromising product quality and profitability.

COURSE DESCRIPTION

This four-day course is intended to strengthen the student's ability to optimize process performance. The first half of the course focuses on improving regulatory control loop performance. The measurement of process dynamics and Lambda tuning are the key topics. The second half of the course focuses on advanced control strategies (cascade, feedforward, ratio control), the development of tuning strategies and process control troubleshooting procedures. Approximately 40% of the course time is devoted to a computer-based simulation lab. The lab exercises effectively reinforce the concepts presented in the lectures

INSTRUCTORS

Doug Nelson, P.Eng. has over 25 years of industrial process control experience. He has authored papers on dryer control, loop performance monitoring systems, control valve selection and the uses of process simulation in optimization surveys. **George Jablonsky, ASCT** has 20 years of industry experience in process control, instrumentation and optimization in the pulp and paper industry. He has held positions both in operations and maintenance management.

WHO SHOULD ATTEND

The course is primarily intended for process engineers, instrumentation engineers and operations personnel who want to improve their ability to troubleshoot process control and variability problems. The course explores the implications of process equipment design and process variability and therefore would be beneficial for maintenance and design engineers.

COURSE LOCATION

The course will be held at the Sawridge Inn Edmonton South (4235 Gateway Boulevard North, Edmonton, AB T6J 5H2). Registrants are responsible for their own hotel room reservation. For your convenience we recommend that you stay at the Sawridge Inn (780-438-1222 or toll free 888-729-7343) where a block of rooms has been reserved. When making your reservation mention you are with the ProNamics Process Control Course.

REGISTRATION

Registration fee is \$2200 CDN for the 4-day course. Attendees need to register 3 weeks in advance to ensure space and materials will be available. ProNamics Control reserves the right to cancel the course based on a minimum number of registrants. The course is limited to 15 participants.

COURSE SCHEDULE

Day One

- Lecture 1** **Process Variability Overview**
08:00 - 09:30
- Lecture 2** **Process Control Basics**
09:30 - 11:00
Control Loop terminology
Loop overview—block diagram
Loop components—sensors, controller, actuators/valves, performance guidelines
- Lab 0** **Simulator Introduction**
11:00 - 12:00
- Lecture 3** **Process Dynamics**
1:00 - 3:00
Open loop bump test procedures
First Order process dynamics
Integrating process dynamics, Non-linearities
- Lab 1** **Process Dynamics**
3:00 - 4:30

Day Two

- Lecture 4** **Tuning the PID Controller**
8:00 - 11:00
PID controller functioning
Lambda tuning procedures
PID controller capability
- Lab 2** **Lambda Tuning 1st Order Loops**
11:00 - 12:00
- Lab 3** **Lambda Tuning Integrating loops**
1:00 - 3:00
- Lecture 5** **Control Loop Performance**
3:00-4:30
Symptoms of poorly performing loops
Load disturbance rejection capability, Filtering

Day Three

- Lecture 5** **Advanced Process Control**
8:00 - 10:00
Cascade, Ratio, Feedforward
Adaptive Tuning, Output Linearization
Developing tuning strategies
- Lab 4** **Tuning Strategy Development**
10:00-12:00
- Lecture 6** **Optimization Tools**
1:00 - 3:00
Data collection fundamentals/tools
Time series analysis techniques
Tuning, Loop monitoring software
- Lecture 7** **Analytical Troubleshooting Procedures**
3:00 - 5:00
Identifying the problem source
Dealing with complex loops and strategies

Day Four

- Lab 5** **Troubleshooting Control Loop Problems**
8:00 - 11:00
- Lecture 8** **Managing Process Variability**
11:00 - 12:00
Roadmap for improving control performance
Identifying economic opportunities
- Lecture 9** **Special Topics**
1:00 - 2:00
Auditing techniques/procedures
VFD Opportunities
Tips for identifying process non-linearities
- Lab 6** **Process Audit**
2:00 - 4:00
- Wrap-Up**

ABOUT PRONAMICS CONTROL INC

ProNamics Control Inc is a process optimization company based in Vancouver, BC. The company conducts process and control optimization surveys, prepares process simulations to establish best practices and provides a range of training courses related to process control optimization. Visit our web site at www.pronamicscontrol.com for more information about our services.

REGISTRATION FORM / CONTACT US: Fax to 604-898-1378

Name: _____ Position: _____
 Company: _____ Email: _____
 Address: _____
 Phone: _____ Fax: _____
 Payment: Full Payment Enclosed Invoice my company
 Signature: _____ Date: _____

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