



VARIABILITY MANAGEMENT SERVICES

Delivering Maximum Control Performance

Control loop troubleshooting and performance analysis

Emerson's variability management experts work closely with your process and control engineers to provide:

- Process loop optimization
- Coordinated unit loop tuning
- Control system troubleshooting
- Regulatory control optimization to enable APC
- EnTech Toolkit diagnostics expertise
- Startup assistance
- Ongoing variability reduction
- Field investigations
- High-fidelity simulations
- Training

Process control loops for temperature, pressure, flow, composition, level, etc. are well suited to optimization with Emerson's EnTech Toolkit and Lambda tuning.

There are many opportunities for improvement, even in new plants. Plants have benefited from variability management both in isolated troubleshooting projects and in complete startup services to optimize each critical control loop.

Base level field instrumentation variability management is also critical for ensuring higher order advanced control effectiveness. Diagnostic data are gathered from any control system either as analog voltages or as digital data from plant servers. In cases where the limitations of the plant cannot be determined by experimentation, a first-principles simulation can reveal the problem and its solution.

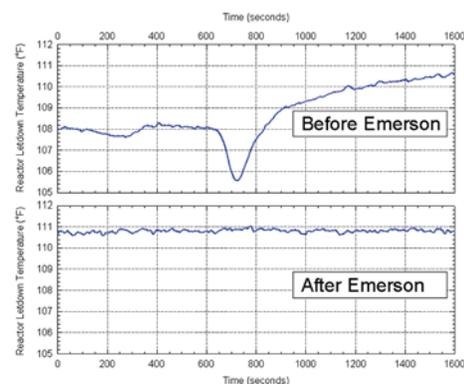
Example Engagements

Life Sciences Industry - Batch centrifuge pressure control

A Pharmaceutical plant in southeastern U.S. was unable to hold pressure constant in a new centrifuge; they could not fill the reagents and washing agents correctly during batch operation. An onsite investigation using the EnTech Toolkit found that an inappropriate controller algorithm had been installed by the turnkey vendor. The controller was reprogrammed in less than two hours and the Lambda tuning method was applied. The result is that product from the centrifuge now meets FDA standards.

Power Industry - Temperature control on a pressurized water reactor

A nuclear power plant in central U.S. experienced large excursions in letdown temperature, requiring frequent intervention by the operators. Investigation using the EnTech Toolkit discovered problems with the control valve's construction, size, and flow characteristic. EnTech specifications were used to replace the control valve and the loop was Lambda tuned. The result is that the temperature and reactor power were finally stabilized.



Chemical Industry - Distillation pressure and temperature control

A PTA plant in the eastern U.S. experienced unreliable distillation column operation, resulting in product loss, excessive intervention by the operators, and negative publicity. The control loops in the unit had been tuned by feel. Lambda tuning was applied to separate the dynamics of the overhead pressure, condenser outlet temperature, and feed pressure.

The result was that variability of the overhead pressure (and hence the acetic acid concentration) was greatly reduced. The savings in acetic acid paid for the project in less than one year. Further opportunities were identified to reduce the process variability by improving the performance of control valves. This project enabled the plant to shift the operating setpoints and implement advanced control.

The control loops were then tuned using the systematic Lambda tuning method with the result of a 57% reduction in variability of spray dryer temperature variations, which allowed the plant to increase production by 12%. The increased production is valued at \$1 US million/year. Further opportunities were identified to optimize startup and production changes, and to reduce the consumption of natural gas.



Mining and Metals - Spray dryer temperature control

Officials at an aluminum hydrates plant in Canada needed to increase production and found that optimizing their loop tuning did not help. Using the EnTech Toolkit, an Emerson engineer found the bottleneck was in the spray drying operations area and required an improved process control design and strategy. By utilizing better pairing of the manipulated and controlled variables, reduction of the variability at its source (before it reached the PID controller) allowed for a much more robust tuning and reduced resonance to a minimum.



Emerson has the process expertise and tools to deliver maximum performance and functionality with your existing technologies.

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