



TEQIP - III Sponsored International Conference on Instrumentation and Control Engineering

(ICECON-2019) 19th - 21st December 2019

PRE-CONFERENCE WORKSHOP ON

ECONOMIC PLANTWIDE CONTROL

19th December 2019



ABOUT THE WORKSHOP

The workshop addresses systematic design of the control system for complex integrated chemical processes with material and energy recycle towards safe, stable and economic process operation. The multiple recycle loops introduce positive feedback in the process with consequently more severe non-linearity (e.g. snowballing and multiple steady states), dynamic interaction between the various units inside the recycle loop(s) as well as potential instability. The course is designed to develop a sound understanding of these phenomena without resorting to esoteric mathematics. The insights are then utilized to develop common sense guidelines for designing a robust regulatory control system that effectively closes the independent material and energy balances for steady process operation. Given robust regulatory control for steady process operation, we then cover strategies for ensuring the process operation is driven as close as possible to the economic optimum steady state. This requires tight capacity bottleneck control as well as tracking the optimum value of the economically important unconstrained setpoints. The former is achieved via proper choice of the throughput manipulator. For the dominant unconstrained optimum, the self-optimizing control paradigm is recommended where we control that process variable which when held constant ensures acceptably small loss from the actual optimum over the envisaged operating space at constant setpoint (i.e. with no setpoint re-optimization). Based on the above, a systematic plantwide control system design procedure is developed. Multiple case studies on complex integrated chemical processes demonstrate the approach. It is hoped that those attending the course will get to appreciate the key role of engineering common sense in solving a seemingly complex problem.

COURSE CONTENTS

The key topics of the course are:

- * Degrees of freedom analysis
- * Need for process control system
- * Effects of recycle loops
- * Key regulatory control structure guideline for recycle systems
- * Plantwide regulatory control system design examples (Economic considerations)
- * Self optimizing control
- * economic plantwide control system design procedure

WHO MAY BENEFIT FROM THE COURSE?

Faculty & Students from any branch of Engineering or Science, Researchers, and Industrial Practitioners can attend and benefit from this course. No familiarity with mathematics is required.



ABOUT THE SPEAKER

His research focuses on practical process engineering/design innovations utilizing the principles of material/energy integration and process intensification. He was strong proponents of the simultaneous process design philosophy encompassing conceptual process design (flowsheet synthesis), steady state economic optimization and operability analysis towards sustainable, green and operable process design. In addition research on algorithmic tools for mass and energy integration, he also focus on systematic economic plantwide control system design towards squeezing out the maximum economic benefit (e.g. maximum throughput or minimum energy per kg product) from a plant without compromising safety and stability. The research applies process systems engineering tools (bifurcation analysis, control structure configuration design, design-controllability interaction etc.) to a wide variety of processes.

Hands on Session at Siemens Centre of Excellence

VENUE

NIT, Trichy.

INSTRUCTIONS

All participants must bring their laptops with MS-Windows 10; these are required for all the hands-on sessions.

Registration Fee		Before 05.12.19	After 05.12.19
		Pre Conference Workshop	Rs. 3000
	Faculty / Industry / R&D Organization	Rs. 3000	Rs. 4000
	Research Scholar / Student	Rs. 2000	Rs. 3000

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