

G784 DYNAMICS AND CONTROL OF CHEMICAL PROCESSES

DESCRIPTION

Process control has become increasingly important in the process industries, since it is critical in the development of more flexible and more complex processes for manufacturing high added value products. Consequently, chemical engineers need to master this subject in order to be able to design and operate modern plants. The concepts of dynamics, feedback and stability are also important for understanding many complex systems of interest to chemical engineers, such as in bioengineering and in general processes in which transformation of matter occurs, emphasizing dynamic behavior, physical and empirical modeling, measurement and control technology, basic control concepts and advanced control strategies.

The course provides an appropriate balance of dynamics and control theory and practice, the latter is developed through case studies and one mini group project.

- Part I provides an introduction to process control and in-depth discussion of dynamic process modeling, based on basic principles of mass and energy conservation.
- Part II is concerned with the analysis of the dynamic (unsteady-state) behavior of processes. In addition, the important topics of empirical models and their development from plant data are presented.
- Part III addresses the fundamental concepts of feedback and feedforward control. The topics include an overview of the process instrumentation that is necessary to implement process control: chemical composition, pressure, temperature, flowrates, final control elements.
- Finally, Part IV is concerned with advanced control techniques. The topics include enhancements of PID control such as cascade control, selective control, gain scheduling, multivariable control and batch process control.