

The Tenth Professor Roger W. H. Sargent

Lecture

Professor Ignacio E. Grossmann
Carnegie Mellon University

“Future and Scope of Mathematical Programming in Process Systems Engineering”

Abstract: Mathematical Programming has proved to be a very useful framework for addressing optimization problems in the design, operation and control of process systems. This is thanks to the vision and pioneering work of Professor Roger Sargent. Through his inspiration researchers in Process Systems Engineering have not only been active in the modeling and application of mathematical programming techniques, but they have also contributed in the theory and methods for nonlinear, mixed-integer, global and parametric optimization, as well as for optimal control, among other areas. These research accomplishments have complemented the research efforts in Operations Research, Numerical Analysis, and other engineering disciplines. In this lecture we briefly summarize some of the past accomplishments in Mathematical Programming and its applications in Process Systems Engineering. We then address three major questions:

- (a) Is Mathematical Programming a growing field or is it mature area where only incremental improvements can be expected?
- (b) What are major challenges that remain in this area and how do they relate to Process Systems Engineering?
- (c) Given the significant changes that are being experienced in the chemical industry and in academic chemical engineering research, will Mathematical Programming play a relevant role in the future of this field?

As we will discuss in this lecture, we anticipate that Mathematical Programming will continue to be an active and intellectually stimulating field, and grow in terms of scope for addressing new and challenging applications in Process Systems Engineering. We present some recent examples for this purpose, and argue that work in the future will require greater emphasis on modelling, strong multidisciplinary collaboration and more effective exploitation of computing power.

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17:30

Lecture Theatre 3

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In the chair: Professor Stratos
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Vote of thanks: Professor Nilay
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