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ΣΕΜΙΝΑΡΙΟ

ΟΜΙΛΗΤΗΣ: Professor Doraiswami Ramkrishna
Harry Creighton Peffer Distinguished Professor
School of Chemical Engineering, Purdue University

ΘΕΜΑ: **ON CYBERNETIC MODELING OF BIOLOGICAL PROCESSES**

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ΕΙΧΗΜΥΘ-ΙΤΕ

ΗΜΕΡΟΜΗΝΙΑ: Τετάρτη, 21 Νοεμβρίου 2001

ΩΡΑ: **12:00**

ΠΕΡΙΛΗΨΗ

Mathematical modeling of biological systems and processes has been inspired by methodologies noted for their success in the treatment of physico-chemical processes. Thus the methods of chemical reaction engineering have guided those of bioreactors as well.
The behavior of biological systems, however, differs strikingly from that of inanimate physico-chemical systems. Biological systems are subject to the role of internal regulation of metabolism, which controls the syntheses and activities of enzymes that catalyze the numerous chemical reactions in metabolism. Consequently, a framework sensitive to the phenomenon of internal metabolic regulation must be used to analyze bioreactors, which display a variety of abnormalities uncharacteristic of our experience with physical systems.
This lecture will report on the performance of a *cybernetic framework,* built on the postulate that the role of evolution has been to endow biological systems to react to their environment in some manner optimal to further the survival of the system. The chief merit of this framework lies in its ability to account for regulation by severing from its detailed description and focusing instead on professed goals in an organized inductive methodology that compares observation with prediction. The capacity of cybernetic models to describe dynamic behavior has attracted investigations of model-based control of bioreactors.
The lecture will cover the successful applications of the cybernetic framework to a variety of biological phenomena strongly influenced by metabolic regulation. These include complex uptake patterns of mixed substrates in bacterial cultures, the ability of the framework to accommodate multiple steady states of cells of grossly varying physiological states as observed in hybridoma cell cultures, and so on. Finally, the capacity of the framework to address the design of genetic changes in an organism for metabolic engineering will be discussed.

Για περισσότερες πληροφορίες μπορείτε να επικοινωνείτε με την Κλεάνθη Ζαχαροπούλου
Τηλ.: 061 – 965.278, Fax: 061-965.223, E-mail: kleanthi@iceht.forth.gr