SCHOOL OF CHEMICAL, BIOLOGICAL & MATERIALS ENGINEERING

And

UNIVERSITY OF OKLAHOMA BIOENGINEERING CENTER

100 E. Boyd, Sarkeys Energy Center, T-335 405-325-5811 The University of Oklahoma Norman, Oklahoma 2010 – 2011 Seminar Series

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CHICAGO, ILLINOIS

Will present a seminar on

"NEW PERSPECTIVE ON CONTROL SYSTEM DESIGN: PSEUDO-CONSTRAINED TO MARKET RESPONSIVE CONTROL"

Since the inception of feedback, there has been a strong, but vague, relationship between control system performance and plant profit. This presentation will highlight recent efforts to quantify such relationships and arrive at controller designs tailored not only to the dynamics of the plant but also to the specific economic situation.

A powerful tool for the economic analysis of dynamic systems is that of Backed-off Operating Point (BOP) selection. The BOP selection procedure is to calculate the closed-loop Expected Dynamic Operating Region (EDOR) and economically optimize the BOP location within a given constraint set. The method of Pseudo-Constrained Control (PCC) allows one to tune a controller to achieve a desired EDOR shape. The first part of the talk will focus on combining BOP selection with PCC, to simultaneously optimize over controller parameters and the BOP to yield not only greater profit but also a controller that is tuned to exploit its economic environment.

In energy intensive operations, plant profit is greatly influenced by utility costs, typically fuel and electricity. In the case of fuel, prices change parametrically. That is, slow enough that a periodic retuning of the controller is likely sufficient. However, electricity prices change rapidly, typically on the time-scale of plant operations. Thus, the controller should consider electricity price as a time-series input similar to that of a disturbance. The notion of Market Responsive Control (MRC) is to exploit measurements of electricity prices to arrive at a controller that maximizes plant profit. As expected, use of the MRC approach will result in plant operations that defray energy intensive operations until electricity prices are low.

THURSDAY, FEBRUARY 24, 2011
COOKIES AND COFFEE -- 2:45 P.M.
SEMINAR -- 3:00 P.M.
SARKEYS ENERGY CENTER, ROOM M-204

THIS IS A REQUIRED SEMINAR FOR CHE 5971

Accommodations on the basis of disability are available by contacting the office above three days before the event.