

DEPARTMENT OF MATHEMATICS AND STATISTICS
MISSISSIPPI STATE UNIVERSITY

COLLOQUIUM

Closing the Loop Through Feedback: Examples from Mathematics and Mathematics Education

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Allen 14

Abstract. Control theory has been a study for mathematicians and electrical engineers alike since the 1960s with the landmark work of R.E. Kalman. Basically, the idea is that many differential equations can model certain dynamical systems but their solutions may lack certain desirable properties such as stability. These properties can be achieved by introducing state feedback into the system.

Interestingly enough, a similar idea is used in mathematics education. A theory is established and often tested in experiments. Based on the results of the implementation of the theory in these experiments, the theory is adjusted and tested again using the notion of analytic induction. Thus, we see another control loop that is adjusted using feedback. Hence, we see that there are common ideas shared in both seemingly disparate fields.

In this talk, I will give examples of feedback control in both mathematics through systems of differential equations defined on arbitrary domains called time scales and feedback control in mathematics education by discussing a model of PCK that I have been working with others to develop.

Dr. Jackson is a candidate for a position in our department. There will be a reception for him in Allen 467 at 3:00 pm.

Contact Bruce Ebanks, ebanks@math.msstate.edu or (662) 325-7160, for additional information.