

Meeting: 1003, Atlanta, Georgia, MAA CP J1, MAA Session on Projects and Demonstrations that Enhance a Differential Equations Course, I

1003-J1-1641 **Shawnee L. McMurrin*** (mcmurrin@math.csusb.edu), CSUSB Mathematics Department, 5500 University Parkway, San Bernardino, CA 92407. *Using Inverse Problems to Twist a Traditional Course in Differential Equations*. Preliminary report.

In this talk we will describe one way in which a traditional elementary differential equations course was enhanced using inverse problems to set the stage for general topics. The outline of this course was inspired by the book *Inverse Problems* by Charles Groetsch.

In a traditional course, many of our examples focus on the following direct problem: Given a differential equation, determine if a solution exists and, if a solution can be obtained, select and apply the appropriate analytical technique for finding the solution. In this manner we provide our students with skills that will eventually help them to create and analyze models of real world phenomena, one of our ultimate goals. Inverse problems are used as a motivating framework for both.

We first pose an inverse problem that will need the analytical tools we want our students to learn. After posing the problem we give students the opportunity to determine what knowledge is needed to solve it. That knowledge can be provided in the "traditional" way. Finally, we apply what we have learned to the solution of the original problem. In this talk we illustrate this approach using specific examples. (Received October 05, 2004)