SDSU
presents
a thesis defense for
Master of Science
degree in
Computer Science

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10:00am
GMCS 555 - ISR Lab

San Diego State University

Leadership Starts Here

Joonyoung Yu

Three Approaches to Inverse Problems:
Solution Clustering, Solution Branches and Feedback Control

Abstract

Inverse problems form an interdisciplinary field encompassing mathematics, physics and engineering. An important application is in robot inverse kinematics where the inverse of a complex trigonometric vector function with discontinuities and multiple solutions is to be found. First, we consider single-input single-output case and then extend the method to cover more general cases. The method uses decomposition of the output space into cells, data generation, clustering, classification of inverse solutions and approximation of the inverse function. The proposed method removes most limitations of the previous work and deals with highly nonlinear and discontinuous functions, as well as ill-conditioned cases. We also present a solution based on the pseudo-inverse and concepts from feedback control. For each proposed method, a program is developed to implement the method and to demonstrate its validity through examples.

Thesis Committee

Mahmoud Tarokh, Thesis Chair, Department of Computer Science