Department of Mathematical Sciences
The University of Texas at El Paso

Colloquium

Barnabas Bede

DigiPen Institute of Technology
Redmond, WA

Friday, September 19, 2014 at 3pm in Bell Hall 143

A survey of fuzzy rule based systems of Mamdani and Takagi-Sugeno types.

Fuzzy sets are able to provide a mathematical model for variables that are subject to non-statistical uncertainty. Fuzzy rule-based systems can be used for modeling and implementation of fuzzy rules of a linguistic type. Fuzzy systems of Mamdani and Takagi-Sugeno types are widely used in various applications and their applicability to several areas of engineering is well-known, while their theoretical foundations are less accurately investigated. The goal of the present talk is to examine these fuzzy systems from a mathematical point of view, considering them as approximation operators. We investigate mainly higher order Takagi-Sugeno fuzzy systems, which have the output of each individual fuzzy rule defined as a polynomial. Under very relaxed conditions both on the target function and the fuzzy sets in the antecedent part, we obtain approximation theorems and error estimates in terms of the modulus of continuity. Takagi-Sugeno approximation of a Mamdani system is discussed as a possible bridge between the above mentioned two disjoint classes of fuzzy systems.

For further information, please contact Dr. Emil Schwab, eschwab@utep.edu
Refreshments will be served in front of the colloquium room,
15 minutes before the start of the colloquium.