

1116-VH-2589      **Barnabas Bede\*** (bbede@digipen.edu), Department of Mathematics, DigiPen Institute of Technology, Redmond, WA 98052. *Fuzzy systems as mathematical models for detective reasoning*. Preliminary report.

A fuzzy set as defined by Zadeh is intuitively a set with a continuum of membership grades. It can be described mathematically as a function  $A : X \rightarrow [0, 1]$ , with the interpretation of  $A(x)$  as the degree of membership of an element  $x$  in the fuzzy set  $A$ . Linguistic variables, as e.g., small, medium, high, can be modeled using fuzzy sets. Expert knowledge, or sometimes even commonsense knowledge, can be modeled using fuzzy rules of the type “If  $x$  is  $A$  then  $y$  is  $B$ ”, where  $A, B$  are fuzzy sets. A fuzzy rule base allows construction of a fuzzy inference system that can provide a conclusion based on given data. This process allows us to model detective reasoning using fuzzy systems, as proposed by Novak. We continue the research direction proposed by Novak, and we consider various solutions to the problem of modeling the reasoning of Lt. Columbo as an example. (Received September 22, 2015)