

FUZZY THEORY AND ITS APPLICATION TO OPTIMIZATION AND CONTROL

Dan Ralescu
Department of Mathematical Sciences
University of Cincinnati
Cincinnati, Ohio 45221
USA



Abstract

Fuzzy sets theory is an important tool for many applications, especially to optimization, and control, risk management, and many others. After a short introduction to fuzzy logic concepts, we discuss a general method to extend set-functions to fuzzy-valued functions. Then we describe applications to *optimization under fuzzy constraints* and *fuzzy logic control*. We argue that the defuzzification method using the center of gravity is not robust. Our conclusion is that defuzzification should use the Steiner point, in order to lead to robust fuzzy control.

Short bio

Dan Ralescu is the coauthor of the first comprehensive monograph on fuzzy sets and systems, published in the early 1970s (1974 in Romanian, 1975 in English). He has authored and coauthored more than 80 papers in scientific journals. In the late 1970s he has initiated the theory of *fuzzy random variables* and *mixed models of uncertainty*. His recent interests are in statistical decision-making under various kinds of uncertainty. He was awarded the IFSA Fuzzy Pioneer in 2003. His international collaborations include lectures in Brazil, China, France, Japan, Romania, Russia, and Spain, among others.