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Granular Fuzzy Models and Modeling: New Conceptual and Algorithmic Developments

Witold Pedrycz
Department of Electrical & Computer Engineering
University of Alberta, Edmonton Canada
and
Systems Research Institute, Polish Academy of Sciences
Warsaw, Poland

e-mail: wpedrycz@ualberta.ca

Abstract

By and large, fuzzy models manifest as numeric constructs and as such are constructed/evaluated at the numeric level. We introduce a concept of *granular* fuzzy models built upon the original fuzzy models. To prudently address pertinent problems of analysis and design emerging there, we introduce a concept of *granular* fuzzy sets whose granular membership functions embrace a wealth of conceptually and practically viable alternatives including interval-valued, fuzzy, and probabilistic mappings. We highlight an emergence of higher type and higher order information granules being regarded as functional entities of granular fuzzy systems. The fundamental problem that becomes central to all investigations is concerned with the formation of information granules. In this talk, we elaborate on the principle of justifiable granularity and discuss its role as a key design vehicle facilitating a formation of information granules on a basis of available experimental evidence (which could be either numeric or granular). A number of architectures and design strategies supporting the development of granular fuzzy models are studied.