## *Fuzzy Logic Reference*

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ABSTRACT: A new method is presented here for predicting porosity and permeability from the compositional and textural characteristics of sandstones. The method employs fuzzy modelling which is a linguistic paradigm based on fuzzy logic, rooted in the theory of fuzzy sets. The essentials of fuzzy modelling are explained using an example of which porosity and permeability values of a sandstone are predicted from five compositional and textural attributes. Compared to statistical modelling, fuzzy modelling is not only assumption-free but is also tolerant of outliers. Fuzzy modelling is capable of making both linguistic and numeric predictions based on qualitative knowledge and/or quantitative data. Thus, fuzzy modelling is not only appropriate for the problem discussed here, but is also desirable for many geological problems characterized by non-numerical knowledge and imprecise information.

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ABSTRACT: The methods and advantages of integrating knowledge-based and geographical information system techniques for the analysis of provenance and diagenesis in sedimentary basins are demonstrated by examples from the Cheshire Basin located in north-west England. Approximate reasoning techniques to handle the vagueness and uncertainty inherent in a large amount of geological data, knowledge and reasoning are reviewed with particular emphasis on provenance analysis using subjective probability theory, Dempster- Shafer theory and fuzzy logic techniques. Object-oriented methods for analysing diagenetic history in user specified volumes of the basin are discussed.

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Nordlund, U., 1996, Formalizing geological knowledge - with an example of modeling stratigraphy using fuzzy logic. Journal of Sedimentary Research, v. 66, p. 689-698. Examines the potential of using methods derived from fuzzy set theory to utilize qualitative geological data in numerical modeling. An example application involving dynamic stratigraphic modeling is used to describe the basic design and function of a simple fuzzy system. The potential of fuzzy logic in geological classification and

prediction are briefly discussed, as are aspects on the robustness and objectiveness of fuzzy methods.

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ABSTRACT: A method of macro-judgement and micro-judgement in which eight factors including tectonic position, oil-generating condition, reservoir condition, cap-rock condition, migration and accumulation condition, preservation condition, reliability and seismic stratigraphy formed the factor set of macro-judgement, and the other six factors containing trap type, trap area, closing height, percentage of sandstone and mudstone, effective space of reserve, burial depth of the target stratum formed the factor set of micro-judgement was adopted in this paper. It is also introduced concretely how to obtain subordinate functions of every factor and to compose fuzzy judgement matrixes. As the result of judging, 36 traps in Haian Depression could be divided into three types.

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