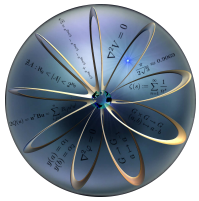

planetmath.org

Math for the people, by the people.

fuzzy logics of living systems

Canonical name	FuzzyLogicsOfLivingSystems
Date of creation	2013-03-22 18:23:58
Last modified on	2013-03-22 18:23:58
Owner	bci1 (20947)
Last modified by	bci1 (20947)
Numerical id	17
Author	bci1 (20947)
Entry type	Feature
Classification	msc 03B15
Classification	msc 03B10
Synonym	biological variability
Synonym	logics of variable supercomplex systems
Related topic	FuzzyLogic2
Defines	operational logic of super-complex systems

0.1 Fuzzy logics of living organisms.

Living organisms or biosystems can be represented as http://planetmath.org/ComplexSystemsBiologysupe complex systems with dynamics that is not reducible to that of their components, such as molecules and atoms. It is an empirically accepted fact that living organisms exhibit a wide degree of 'biological variability': genetic/epigenetic and also phenotypic/metabolic within the same species; their behavior and dynamics thus exhibit a type of 'fuzziness' (refs.[**?**, **?**]) that unlike Zadeh's fuzzy sets characteristic ([**?**, **?**]) is neither random nor always following a (symmetric) Gaussian distribution. It has been proposed that the operational logics underlying http://planetmath.org/FundamentalDiagramsInCategoricalTheoryOfLevelssuper-complex systems dynamics are http://planetmath.org/AlgebraicCategoryOfLMnLogicAlgebrasLM_n many-valued logics for both genetic and neural networks (refs. [**?**, **?**]).

[**Entry under construction**]

References

[1] Georgescu, G. 2006, N-valued Logics and Łukasiewicz-Moisil Algebras, *Axiomathes*, **16** (1-2): 123-136.

[2] Baianu, I.C. and M. Marinescu: 1968, Organismic Supercategories: Towards a Unitary Theory of Systems. *Bulletin of Mathematical Biophysics* **30**, 148-159.

[3] Baianu, I.C.: 1977, A Logical Model of Genetic Activities in Łukasiewicz Algebras: The Non-linear Theory. *Bulletin of Mathematical Biology*, **39**: 249-258.

[4] Baianu, I. C.: 1986–1987a, Computer Models and Automata Theory in Biology and Medicine., in M. Witten (ed.), *Mathematical Models in Medicine*, vol. 7., Ch.11 Pergamon Press, New York, 1513 -1577; URLs: http://doe.cern.ch//archive/electronic/other/ext/ext-2004-072.pdfCERN Preprint No. EXT-2004-072 , and http://en.scientificcommons.org/1857371html Abstract.

[5] Baianu, I. C.: 1987b, Molecular Models of Genetic and Organismic Structures, in *Proceed. Relational Biology Symp.* Argentina; http://doc.cern.ch//archive/electronic/other/ext/ext-2004-067.pdfCERN Preprint No.EXT-2004-067 .

[6] Baianu, I.C.: 2004. Łukasiewicz-Topos Models of Neural Networks, Cell Genome and Interactome Nonlinear Dynamic Models (2004). Eprint: w. Cogprints at Sussex Univ.

[7] Zadeh, L.A., Fuzzy Sets, *Information and Control*, 8 (1965) 338-353.

[8] Zadeh L. A., The concept of a linguistic variable and its application to approximate reasoning I, II, III, *Information Sciences*, vol. 8, 9(1975), pp. 199-275, 301-357, 43-80.