

USING OF FUZZY LOGIC ELEMENTS IN FINANCIAL CONTROL SYSTEM

K. F. Kovalchuk, D. E., prof., National Metallurgical Academy of Ukraine, const1955@mail.ru

N. P. Kozenkova, Senior Lecturer, National Metallurgical Academy of Ukraine,

nkozenkova@gmail.com

V. D. Kozenkova, post-graduate student, National Metallurgical Academy of Ukraine,

kozenkova_vlada@rambler.ru

Research methodology. The results are obtained through the use of the following methods: critical analysis, logical generalization and systematization of formal logic – for the study of evolution of views on the understanding of the nature of uncertainty and its accounting, for the study of existing approaches to the formation mechanism of controlling at industrial enterprises; fuzzy logic theory to describe the functions of the standard accessories.

Results. The content of the stages of controlling management is analysed. Evolution of views on understanding of the essence of uncertainty and its accounting in decision-making is investigated. The main concepts of the accounting of uncertainty are considered.

Genesis of formation of economic applications of fuzzy sets theory as a scientific field is analysed. The basic steps of fuzzy inference are shown. The example of risk assessment of enterprise bankruptcy on the basis of preferences system is given. The main packages of information support of systems of fuzzy logic are presented.

Novelty. The necessity of utilizing the device of fuzzy logic for systems of financial control is proved, calculation of estimates of financial control indicators is presented on the basis of fuzzy and interval method which is effective in situations when probabilistic estimates cannot be received.

Practical value. Realization of fuzzy and interval method on the basis of interval arithmetics gives ample opportunities for application of this method in financial control, which is actually caused by the lack of competitive approaches to creation of reliable tool for the solution of financial control problems.

Keywords: financial control, information, fuzzy logic, management, controlling

Literature

1. Zadeh L. A. *Fuzzy Sets as a Basis for a Theory of Possibility* // Fuzzy Sets and Systems. 1978. Vol. 1.
2. Zadeh L. A. *Outline of a New Approach to the Analysis of Complex Systems and Decision Processes* / IEEE Transactions on Systems, Man, and Cybernetics, SMC-3(1), January 1973. P. 28-44.
3. Buckley, J. *Solving fuzzy equations in economics and finance* // Fuzzy Sets & Systems, 1992, № 48.
4. Buckley, J. *The Fuzzy Mathematics of Finance* // Fuzzy Sets & Systems, 1987, № 21.
5. Kosko B. *Fuzzy thinking* / Hyperion, 1993.

6. Kosko B. *Neural Networks and Fuzzy Systems* / Englewood Cliffs, NJ: Prentice-Hall, 1991.
7. Fuzzy Logic Toolbox. *Manual. 1994-2006* The MathWorks, Inc. [Electronic resource] // Mode to access: <http://www.mathworks.com/access/helpdesk/help/toolbox/fuzzy/index.html>
8. Недосекин А. О. Оценка риска бизнеса на основе нечетких данных / А. О. Недосекин // [Электронный ресурс] / Код доступа : http://sedok.narod.ru/sc_group.html
Nedosekin A. O. *Otsenka riska biznesa na osnove nechetkikh dannykh* [Estimation of business risk on the basis of indistinct data] / A. O. Nedosekin. [Electronic resource] // Mode to access: http://sedok.narod.ru/sc_group.html
9. Головина Т. А. Теория и методология контроллингового управления промышленными предприятиями в условиях нелинейного развития экономических систем : монография / Т. А. Головина – Орел : ФГБОУ ВПО «Госуниверситет – УНПК», 2011. – 330 с
Golovina T. A. *Teoriya i metodologiya kontrollingovogo upravleniya promyshlennymi predpriyatiyami v usloviyakh nelineynogo razvitiya ekonomicheskikh sistem* [The theory and methodology of controlling management of the industrial enterprises in the conditions of nonlinear development of economic systems] / monograph / T. A. Golovina – Orel : FGBOU VPO «State university – UNPK», 2011. – 330 p.
10. Кутанин Ю. В. Алгоритм организации контроллинга на предприятии / Ю. В. Кутанин // Российский экономический интернет-журнал: Электронный журнал. – М. : АТиСО, 2009. № гос. регистрации 0420600008. [Электронный ресурс] / Код доступа: <http://www.e-rej.ru/Articles/2009/Kutanin.pdf>.
Kutanin Yu. V. *Algoritm organizatsii kontrollinga na predpriyatii* [Algorithm of the organization of controlling at the enterprise] / Yu. V. Kutanin // the Russian economic Internet magazine: Electronic magazine. Moscow : АТиСО, 2009. №. state. registration 0420600008. [Electronic resource] // Mode to access: <http://www.e-rej.ru/Articles/2009/Kutanin.pdf>.
11. Иванов М. М. США: управление наукой и нововведениями / М. М. Иванов, С. Р. Колупаева, Г. Б. Кочетков ; ред.: Л. И. Евенко, Г. Б. Кочетков ; АН СССР, Ин-т США и Канады. – М. : Наука, 1990. – 216 с.
Ivanov M. M. *SShA: upravlenie naukoj i novovvedeniyami* [USA: management of science and innovations] / M. M. Ivanov, S. R. Kolupayeva, G. B. Kochetkov; AN SSSR, In-t SShA i Kanady. – M. : Nauka, 1990. – 216 p.
12. Тычинский А. В. Управление инновационной деятельностью компаний: современные подходы, алгоритмы, опыт / А. В. Тычинский. – Таганрог : ТРТУ, 2006. – 108 с.
Tychinsky A. V. *Upravlenie innovatsionnoy deyatelnostyu kompaniy: sovremennye podkhody, algoritmy, opyt* [Management of innovative activity of the companies: modern approaches, algorithms, experience] / A. V. Tychinskiy. – Taganrog : TRTU, 2006. – 108 p.
13. Bayes T. *Facsimilies of two papers by Bayes: An essay toward solving a problem in the doctrine of chances. With Richard Price's foreword and discussion. With commentary by Edward C. Molina.* // Phil. Trans. Royal Soc., 1963.
14. Savage L. J. *The foundation of Statistics*. N.Y. : Wiley, 1954.
15. Смоляк С. А. Оценка эффективности инвестиционных проектов в условиях риска и неопределенности (теория ожидаемого эффекта) / С. А. Смоляк. – М. : ЦЭМИ РАН, 2001. – 143 с.
Smolyak S. A. *Otsenka effektivnosti investitsionnykh projektov v usloviyakh riska i neopredelennosti (teoriya ozhidaemogo effekta)* [Estimation of efficiency of investment projects in the conditions of risk and uncertainty (the theory of the expected effect)]. / S. A. Smolyak. – M. : TsEMI RAN, 2001. – 143 p.
16. Hurwicz L. Optimality Criteria for Decision Making under Ignorance // Cowles commission papers, 1951, №370.
17. Лившиц В. Н. Оптимизация при перспективном планировании и проектировании / В. Н. Лившиц. – М. : Экономика, 1984. – 224 с.
Livshits V. N. *Optimizatsiya pri perspektivnom planirovanii i proektirovanii* [Optimization at advance planning and design] / V. N. Livshits. – M. : Ekonomika, 1984. – 224 p
18. Dubois D., Prade H. *Fuzzy Sets and Systems*. N.-Y., Academic Press, 1980
19. Zemankova-Leech, Maria, and Abraham Kandel. *Fuzzy Relational Data Bases: A Key to Expert Systems* / Cologne: Verlag TUV Rheinland, 1984.
20. Bojadziev G. *Fuzzy Logic for Business, Finance and Management* // Advances in Fuzzy Systems, 1997. Vol. 12.
21. Bojadziev G., Bojadziev M. *Fuzzy Sets, Fuzzy Logic, Applications*. World Scientific Pub Co, 1996.
22. Dimova L., Sevastjanov P., Sevastianov D. *Fuzzy Capital Budgeting: Investment Project Valuation and Optimization* // Chenstohova Tech. University Proceedings, 2001
23. Хил Лафуенте А. М. Финансовый анализ в условиях неопределенности: Пер. с исп. Под редакцией Е. И. Велеско, В. В. Краснопрошина, Н. А. Лепешинского / А. М. Хил Лафуенте. – Мн. : Тэхналопя, 1998. – 150 с.
Khil-Lafuente A. M. *Finansoviy analiz v usloviyakh neopredelennosti*. [The financial analysis in the conditions of uncertainty]. Per. s isp. Pod redaktsiyey E. I. Velesko, V. V. Krasnoproshina, N. A. Lepeshinskogo / A. M. Khil Lafuente. – Mn. : Tekhnalogiya, 1998. – 150 p.
24. Zimmerman H. *Fuzzy Sets Theory - and Its Applications*. Kluwer Academic Publishers, 2001.

25. Алтунин А. Е. Модели и алгоритмы принятия решений в нечетких условиях: Монография / А. Е. Алтунин, М. В. Семухин. – Тюмень : Издательство Тюменского государственного университета, 2000. – 352 с

Altunin A. E., Semukhin M. V. *Modeli i algoritmy prinyatiya resheniy v nechetkikh usloviyakh* [Model and algorithms of decision-making in fuzzy conditions]: Monograph. / A. E. Altunin, M. V. Semukhin. – Tyumen : Izdatelstvo Tyumenskogo gosudarstvennogo universiteta, 2000. – 352 p

26. Борисов А. Н. Принятие решений на основе нечетких моделей. Примеры использования / А. Н. Борисов, О. А. Крумберг, И. П. Федоров. – Рига : Зинатне, 1990. – 184 с.

Borisov A. N. *Prinyatie resheniy na osnove nechetkikh modeley. Primery ispolzovaniya* [Decision-making on the basis of fuzzy models: use examples] / A. N. Borisov, O. A. Krumberg, I. P. Fedorov. – Riga : Zinatne. 1990. – 184 p.

27. Гриняев С. Нечеткая логика в системах управления / С. Гриняев. [Электронный ресурс] / Код доступа: <http://www.computerra.ru/offline/2001/415/13052/print.html>

Grinyaev S. *Nechetkaya logika v sistemakh upravleniya* [Fuzzy logic in control systems] / S. Grinyaev [Electronic resource] // Mode to access: <http://www.computerra.ru/offline/2001/415/13052/print.html>

28. Штовба С. Д. Введение в теорию нечетких множеств и нечеткую логику проекта / С. Д. Штовба. [Электронный ресурс] / Код доступа: <http://matlab.exponenta.ru/fuzzylogic/book1>

Shtovba S. D. *Vvedenie v teoriyu nechetkikh mnozhestv i nechetkuyu logiku proekta* [Introduction into the theory of fuzzy sets and fuzzy logic of the project] / S. D. Shtovba. [Electronic resource] // Mode to access: <http://matlab.exponenta.ru/fuzzylogic/book1>