Assessing the ecologic-economic efficiency of an investment policy

GABRIELA CRISTESCU, LIVIU SEVASTIAN BOCÎI AND LAURENŢIU JITARU

ABSTRACT.

We present a manner of assessing the ecologic-economic efficiency of an investment project, which provides the decision maker with an inner characterization of the project, depending only on the results of the project itself. The mathematical model is based on multiple criteria binary programming. The solution of this model leads the decision maker to using an ecologic-economic efficiency index, which arises from finding a Pareto point of the multiple criteria programming problem. The possibility of gambling with the relative importance of criteria provides the decision maker with extended information on the consequences of the investment project on the environment. The stability properties of the multiple criteria decision making technique based on the ecologic-economic efficiency index is studied, determining the intervals of stability. Our method is tested on the problem of modernizing the Romanian rail from ecologic point of view.

REFERENCES

[1] Baker, T., Ekins, P. and Strachan, N., *Energy-Economy-Engineering-Environment: An E4 Representation of the UK Energy System*, UK Energy Research Centre, on line [http://www.ukerc.ac.uk]

[2] Brans, J-B. and Mareschal, B., *PROMETHÉE-GAIA. Une méthode d'aide à la décision en présence de critères multiples*, Édition de l'Université de Bruxelles, Édition Ellipses, 2002

[3] Cristescu, G. and Lupşa, L., *Non-Connected Convexities and Applications*, Kluwer Academic Publishers, Dordrecht / Boston / London, 2002

[4] Galperin, E.A., *Nonscalarized Multiobjective Global Optimization*, J. O. T..A. 75(1992), 1, 69-85

[5] Lupşa, Luciana, *Construction of a Medico-Economic Effectiveness Index which Characterizes a Vaccine*, Séminaire de la Théorie de la Meilleure Approximation, Convexité et Optimisation (Elena Popoviciu, ed.), Srima, Cluj-Napoca, 2001, 61-65

[6] Neamţiu, L., *Applications of the Numerical Analysis, Optimisation and Informatics in Medecine (in Romanian)*, Ph.D. Thesis, "Babe?-Bolyai" University of Cluj-Napoca, Faculty of Mathematics and Computer Sciences, Cluj-Napoca, 2007

[7] Roy, B. and Slowinski, R., *Handling effects of reinforced preference and counter-veto in credibility of outranking*, European Journal of Operational Research 188:1 (2008), 185-190

[8] Siderius, H-P. and Harrison, R., An Energy Efficiency Index for TVs, In *Energy Efficiency in Household Appliences and Lighting* (editors Bertoldi, Ricci, de Almeida), Springer Verlag, Berlin, 2001, 267-277

[9] Taskin, F. and Zaim, O., *The role of international trade on environmental efficiency: a DEA approach*, Economic Modelling, 18(2001), 1, 1-17

[10] Varsavsky, M., *Legislation Efficiency Index*, (2005) on line [http:// english.martinvarsavski.net/general/legislation-efficiency-index.html], posted May 29 2006. [26]

[11] *Energy Efficiency Index*, NUS Centre for Total Building Performance, on line [http://www.bdg.nus.edu.sg/buildingenergy/e_energy/audit_results.html].

[12] C.F.R., *CFR şi protecţia mediului*, on line [http://www.cfr.ro]

[13] U.I.C., *Guide to establish the indicators of environment for the railways*, on line [http://www.uic.asso.fr/environment]

"AUREL VLAICU" UNIVERSITY OF ARAD
DEPARTMENT OF MATHEMATICS
BD. REVOLUŢIEI NR. 77
310130 ARAD, ROMÂNIA
E-mail address: gcristescu@inext.ro

"AUREL VLAICU" UNIVERSITY OF ARAD
FACULTY OF ENGINEERING
BD. REVOLUŢIEI NR. 77
310130 ARAD, ROMÂNIA
E-mail address: bociis@yahoo.com
E-mail address: laurentiu_j@yahoo.com