Scientific Report on the implementation of the project "Portfolio Selection Models and Applications" 2011

The objective of the project for the year 2011 is:
Research on models for sustainable development.
The sub-objectives are:
a) Survey on models for sustainable development
b) Formulation of portfolio selection models for crop planning under environmental constraints.
The expected results to be obtained for the objectives are: Minimum one published / accepted paper in an ISI indexed journal and a research report.

Several surveys on the applications of portfolio theory to sustainable development were made in the papers [1], [3]-[5]. They contain the expected results to be obtained for both sub-objectives.
In the paper [1] a synthesis on the models for sustainable development in industry and agriculture was presented. The models are planning models with environmental constraints. The ideas underlying these models are inspired from the theory of financial investments. The role of financial assets is played here by various industrial products manufactured or by crops. The considered models are in continuous variable and discrete variable.
In the paper [2] a general criterion for determining the existence and uniqueness of solutions of nonlinear equations was given. Solving nonlinear equations is an issue arising in optimization problems (in particular patterns of portfolio theory).
In the paper [3] have been formulated several models for crop planning, based on portfolio theory in the presence of environmental constraints. The models aim to solve the tradeoff between economic goals and those of reducing application of fertilizers and pesticides.
In the paper [4] have been developed two single period portfolio selection models for production planning in fish farms. The models are stochastic programming models and represent an alternative to mean-variance models. One of these models is a "safety first" type model and the other is a "chance constraints" type model. Some of the variables are real numbers and others are binary variables, i.e. take only the values zero and one.
All the models were based on portfolio theory. Models constraints are related to budgets farms and the minimum quantities of fish of each species to be collected.
Paper [5] is a research report that includes a survey on portfolio selection models for production planning under environmental constraints.
All the targets of the research project were successfully met in the 2011 stage.
The expected results to be obtained were published in ISI indexed journals and in international conferences proceedings. A research report on the subject connected with the second objective of the project was elaborated.

Chapters in books

[1] Radulescu M., Radulescu C.Z., Zbaganu Gh., Operations research methods in production management with environmental constraints, chapter 5 in Environmental Planning, Editor: Rebecca D. Newton, pg 135-166, 2011 Nova Science Publishers, Inc. New-York, ISBN: 978-1-61728-654-4.

Papers published in international journals (ISI indexed)

[2] Radulescu M., Radulescu S., Balreira C. E., A generalization of the Fujisawa-Kuh global inversion theorem, J. Math. Anal. Appl., 382, (2011), 559-564. (2010 impact factor 1.174) Relative Influence Score: 1.168.

[3] Rădulescu M., Rădulescu C.Z., Zbaganu Gh., A portfolio theory approach to crop planning under environmental constraints, Annals of Operations Research, DOI: 10.1007/s10479-011-0902-7. (online). (2012 impact factor 1.029)

Papers published in Proceedings of international conferences

[4] Rădulescu M., Rădulescu C.Z., Turek Rahoveanu M., Safety-first and chance-constrained production planning models for fish farms, 11th WSEAS Int. Conf. on Systems Theory and Scientific Computation (ISTASC '11), Florence, Italy, (2011), 199-204. ISBN: 978-1-61804-027-5.

[5] Rădulescu M., Portfolio selection models for production planning under environmental constraints, Research Report, October 2011.

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