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Mahutov N.A., Solozhentsev E.D.

The connection of statistical data, management, efficiency, and risk on the basis of the logical-and-probabilistic (LP) risk theory with groups of incompatible events (GIE) is considered. Systematization and generalizations subject to risk LP-models with GIE for various applications are implemented. Applications areas, advantages, differences, model types, and featured properties of the risk LP-theory with GIE are described.

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The solutions optimal with respect to the degree of stability are examined for PI control of dynamic systems governed by transfer functions with a zero power polynomial in the numerator. The paper shows that there exist 7 cases of maximum degree of stability attainment in control systems. Sufficient optimality conditions are formulated for each case. The hodographs of closed-loop control systems meeting either only necessary or only sufficient optimality conditions are built. The shape of optimal systems' hodographs demonstrate the geometric sense of the solutions obtained.

Strakhov A.F., Strakhov O.A.

Based on the summarized experience of theoretical and practical research, the paper discusses the concepts of developing integrated personal data of population at specific territories and explains the ways to improve demographic forecasts accuracy based on metrological applications and the theory of multi-parameter measuring system synthesis.

Spiro A.G.

The phenomenon of stock price gap at the beginning of a stock exchange auction is examined. The paper classifies the gaps, discusses their properties and offers a mathematical description. A case study of Gasprom stock price gap analysis at Russian Trading System stock exchange is included.

Kornoushenko E.K.

An approach is proposed for the case of heterogeneous samples where the original observations (objects) sample breaks up into classes with significantly different values of the dependent variable (but not the regressors) which are sufficiently representative for building an independent regression model in each class. A case study shows how the approach proposed enables estimation quality improvement against the conventional regression method.

Losev A.G., Radchik M.V.

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Podlazova A.V.

The solution of discrete optimization problems by means of genetic algorithms is considered. The developed data structures and genetic operators are described. Generic features, merits, and drawbacks of genetic algorithms are discussed.

Kubyshkin V.A., Sukhoverov V.S.

The structure and composition of a computerized system for mobile heating source's motion and capacity are discussed. Object models and motion control design technique are presented. The system's key blocks and a variant of its implementation as a software complex in MATLAB environment are described.

Shubin A.B., Alexandrov E.G., Harchenkov G.G.

An algorithm for the programmed control of elastic structure's orientation is offered that provides the prediction of the finite state and its sequential correction. The paper shows that discrete control ensures object's fast turn at the specified angle and further holds it in the specified position with simultaneous rejection of structure's elastic vibrations owing to control impacts developed for holding the object's aspect angle in admissible deviation region. An example of the algorithm realization is adduced.



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