

CONTENTS & ABSTRACTS

PHYSICS VS. SOCIOPHYSICS. PART 2. NETWORKS OF SOCIAL INTERACTIONS. 2

Slovokhotov Y.L.

Recent researches in sociophysics (a new field of physics studying social processes) and the neighboring fields of computational modeling in social sciences, are reviewed. A survey of the influence of climate and solar activity on historical dynamics, as well as of the systems of «living» particles (including vehicular traffic and pedestrian movement) were presented in the first part of the paper. In this part, the networks of social interactions (a structural basis of any social system) and physical description of economic phenomena (econophysics) are discussed. In the third part, computational models of sociology, political science, linguistics and mathematical history will be reviewed.

Keywords: interdisciplinary physics, modeling of social systems, sociophysics.

CYCLICAL GROWTH IN A MODEL OF CLOSED DECENTRALIZED ECONOMY 32

Abramov A.P.

The paper considers a dynamic model of closed decentralized economy with Leontief's technologies. The conditions under which the sequence of normalized outputs has either a limit or a limiting cycle are defined; the latter contains a finite number of points. The limit as well as the limit points are defined by the used technologies and decision-making system.

Keywords: decentralized economy, cyclical growth, Leontief's technologies.

MODELS OF MOB CONTROL 38

Breer V.V., Novikov D.A.

Threshold model of a group of agents is considered. These agents, making binary decisions to act or not to act, take into account the decisions of the rest of the group. The problem of control of thresholds and reputations is set and solved. The aim of control is to reduce the number of agents that decided to act.

Keywords: collective behavior, threshold model of decision making, mob control.

RATINGS WITHOUT COMPENSATIONS AND THEIR APPLICATION. 45

Goncharov A.A., Chistyakov V.V.

Basing on the explicit formula for the enumerating preference function, representing the threshold rule (leximin) for the comparison of alternatives, the paper introduces two rating indices such that one of them takes into account weights and the other one does not. In situations when compensations are not involved (i.e., bad properties of alternatives cannot be compensated by their good properties) the indices express quantitative as well as qualitative exponents. The example of application of indices for rating scholars, whose progress in their studies is characterized by vector grades of high dimension with integer components in given.

Keywords: preference, leximin, compensation, enumerating preference function, rating index.

SEMANTIC-AWARE OPTIMIZATION OF USER INTERFACE MENUS 53

Goubko M.V., Danilenko A.I.

While the problem of hierarchical menu design is very common in user interface design, existing approaches lack either semantic aspects or optimization techniques. We suggest a semantic-aware mathematical model of hierarchical menu optimization and algorithms developed on the basis of this theory. These algorithms are implemented in the ready-to-use design tool. The approach is illustrated by the optimization of a banking voice menu.

Keywords: user interface optimization, hierarchical menu, semantic quality, menu design automation.

NON-STATISTICAL INFORMATION AND ITS APPLICATION FOR PRODUCTION SYSTEMS MANAGEMENT 64

Chuprov S.V.

The method of deterministic evaluation of non-statistical information and order of the states of production system is proposed from the position of systems theory. On the basis of cybernetic conception of the variety of system states we discover some characteristics of measure of order and disorder of production systems states. The method of non-statistical information application for adaptive management of production systems is grounded.

Keywords: entropy, determinate evaluation, diversity of states, stability, sufficientness principle.

FORMATION OF CONFLICT-FREE TRAJECTORIES OF MANEUVERING BEFORE LANDING, TAKING INTO ACCOUNT THE LIMITATIONS ON THE MANEUVERING CAPABILITIES OF THE PLANE. 70

Bazhenov S.G., Kulida E.L., Lebedev V.G.

Developed the principles of trajectories safely maneuver before landing for intellectual system of information support of the flight crew. The system defines conflict situations, generates warnings and recommendations of the pilots to avoid dangerous development of flight situation on the stage maneuvering before landing. The developed approach to the formation of conflict-free trajectories allows taking into account restrictions on the trajectory, maneuverable aircraft performance, capabilities of the system management in conditions of difficult terrain.

Keywords: security, terrain, CFIT, the area of flight modes, limit, control system, warning, typical trajectory.

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(on the occasion of 75th anniversary from the date of birth and 50th anniversary of work in the Institute of Control Sciences). 76

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