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## ON AN OPTIMALITY OF THE SINGULAR WITH RESPECT TO COMPONENTS CONTROLS IN THE GOURSAT — DOURBOUX SYSTEMS . . . . . 2

**Sh.Sh. Yusubov**

The paper proposes the definition of control singular with respect to the part of components in the Pontryagin's maximum principle sense and singular with respect to the remain components in the classical sense. New necessary conditions of optimality are derived in the Goursat — Dourboux systems.

**Keywords:** necessary conditions, optimality, singular with respect to components control.

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**A.G. Alexandrov, D.V. Shatov**

The method of adaptive control for SISO linear plant in presence of unknown bounded disturbances is proposed. Coefficients of the plant are unknown and can be changed in some particular time points. The adaptation algorithm consists of two procedures: identification and synthesis. The identification procedure is based on the finite-frequency identification of the plant and closed-loop system. The synthesis procedure is based on the modal control technique. The algorithm of modal polynomial selection providing specified accuracy gain and phase margins for the system is proposed. Numerical example of adaptation is provided.

**Keywords:** adaptive control, identification, modal control.

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**V.N. Afanasiev, A.A. Semion**

For a class of nonlinear uncertain dynamic objects presented in the form of models with linear structure and state dependent coefficients the control problem is formulated in the key control differential game with quadratic quality functional. The synthesis of controls which leads to need of Riccati equation solution with parameters depending on states at rate of object functioning is carried out. The method for finding the realizable values of the controller parameters based on the solution of this equation in some points of the trajectory of the system and determining the parameters of the controller to control the corresponding intervals is proposed. The results are illustrated by mathematical modeling of a hypothetical object.

**Keywords:** nonlinear uncertain dynamic systems, differential games, Hamilton — Jacobi — Isaacs equation, Riccati equation.

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**S.A. Kochetkov, V.A. Utkin**

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**Keywords:** electric drive, direct current drive, asymptotical invariance, external disturbances, relay control algorithm.

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**Keywords:** random graph, social network, consensus, collective behavior, thresholds.

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**L.G. Egorova**

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**Keywords:** agent-based models, trading strategies, prosperity of an agent, probability of bankruptcy.

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**Keywords:** mass appraisal, regression model with continuous (or categorical) dependent variable, classification algorithm, dispersion analysis, Fisher's linear discriminant analysis.

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**Keywords:** rational bubble, difference-stationary process, the explosive process, Dickey — Fuller unit root test, hypotheses sequential testing algorithm.

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**Keywords:** vulnerability, assessment of failures, electric networks.

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**G.P. Aksenova**

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**Keywords:** application-specific integrated circuit (ASIC), field-programmable gate array, on-line testing, circuit under test, test response analysis, signature analyzer, fault location.

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**T.Ye. Somova**

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**Keywords:** satellite, control system, imitation, animation, in-flight support.

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