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STOCHASTIC IDENTIFICATION MODEL FOR FORECASTING OF PARAMETERS OF DEVICES OF ELECTRIC TRANSPORT SYSTEMS

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Authors

M. Kostin*, **T. Mishchenko****

Dnipropetrovsk National University of Railway Transport named after Academician V. Lazaryan,

Lazaryan Str., 2, Dnipro, 49010, Ukraine,

e-mail: nkosten@ukr.net, mishchenko_tn@ukr.net

* ORCID ID : <http://orcid.org/0000-0002-0856-6397>

** ORCID ID : <http://orcid.org/0000-0001-6336-7350>

Abstract

The necessity to create mathematical models of complex powerful devices of electric traction systems which provide speed and high-speed train movements using identification methods has been justified. A pulse transition function is recommended to be used as an identification model. Using correlation theory for stochastic processes which are voltage and currents in electric traction systems, analytic expression of correlation Wiener-Hopf integral equation has been obtained. Solution of the equation makes it possible to obtain a pulse transition function.

Operational, numerical and factorization methods for the equation solving have been considered. Auto- and intercorrelation functions of stochastic current and voltage processes in the system, which are necessary for the solution of integral equation, were defined using experimental method on functioning sections of railroad. Using numerical and factorization methods a pulse transition function as a forecast model was defined for electric locomotive of a direct current DE1 used on electrified sections of Prydneprovska railway. For this purpose monitoring of stochastic voltage and traction current processes was conducted in real operating conditions. Pulse transition functions were defined as exponential functions. References 24, figures 4. table 1.

Key words: identification, model, forecasting, weight function, stochastic process, electric traction.

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