Computing and Optimization for DC Power Systems of Electric Transport

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COMPUTING AND OPTIMIZATION FOR DC POWER SYSTEMS OF ELECTRIC TRANSPORT

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Dedication

The book is dedicated to young scientists who, despite all the difficulties of the thorny path of science, are engaged in research and development, as well as those leaders who support their undertakings and aspirations, encourage them and do not give up on their followers in crucial moments.

The authors of this monograph express their sincere gratitude to the scientist, professor and mentor, the man who rallied young scientists around himself, inspired and supported them, and now is the embodiment of the science of railway transport — **Professor S.V. Myamlin, D.Sc.**

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Preface

This monograph describes the difficulties associated with computing and optimization of traction power systems of electrified transport. An original approach is proposed for the analytical description of the processes of consumption and regeneration of electric energy, which can be used both in urban transport systems (metro, tram, trolleybus) and on electrified railways. The monograph also includes examples that show the use of several methods for optimizing power supply modes using software packages MathCAD and MatLab Simulink.

The idea of the proposed calculation method has matured for 10 years. When performing electrical calculations as well as in the process of measuring the performance indicators of traction power supply systems, the authors gained considerable experience. The combination of different approaches for solving single-type tasks, in addition to modern computational capabilities, formed the main points of the suggested method. Despite the fact that the co-authors of the monograph use it in different ways, the fundamental principles of the method did not undergo significant changes, but they only supplemented it and allowed getting a new angle on the complex processes.

A great contribution in preparing the manuscript for publication was provided by the translators, Olena Zhylenko and Tatiana Kirpa. The authors show their sincere appreciation to World Scientific Publishing and thank the staff involved in the publishing.

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Yevhen Kosariev is an Associate Professor in the Intelligent Power Supply Systems Department at Dnipro National University of Railway Transport. He graduated in 2013 from the Power Engineering Faculty of the Dnipro National University of Railway Transport, named after Academician V. Lazaryan. In 2018, he received his Ph.D. degree. He has 6 years of research experience in power supply systems for electric transport. He is the co-author of more than 10 scientific and technical reports, which include works relating to the state order. He has authored three security documents and more than 40 scientific publications. His research interests include electric transport, power supply systems, energy efficiency, and renewable energy sources. He lives and works in Dnipro, Ukraine.

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