

HISTORY OF SCIENTIFIC RESEARCH IN THE FIELD OF MATHEMATICAL MODELING OF ENERGY ASSETS AND SYSTEMS IN UKRAINE

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From the middle of the XX century the development of power engineering was associated with the creation of giant geographically distributed power systems. As a consequence, there became a need for comprehensive, interdisciplinary studies of the problems of the development and operation of energy systems. The creation and widespread use of electronic computing, as well as the development of methods of computational mathematics, contributed to the launch of a new direction of research. The first fundamental studies of modeling methods and similarities, which gained worldwide recognition, were conducted at the first half of the XX century and were made by the academicians M. Kyrpychov, L. Sedov, M. Pavlovsky, S. Lebedev. In particular, the modeling theory, developed by M. Kyrpychov, was applied in thermal engineering, energy engineering and chemistry. It should be mentioned that the first scientific work in the field of modeling and similarity belongs to Professor P. Kopniaev.

In Ukraine, the direction of electronic modeling started in the mid-XX century by corresponding member of the All-Ukrainian Academy of Sciences Professor of Kyiv University V. Dyachenko. P. Filchakov at the Institute of Mathematics of the Academy of Sciences of the Ukrainian SSR developed methods of flat static fields modeling on electrically conductive paper. New type integrators were created and some problems in the theory of quasiconformal mappings were solved, and also some aspects of their application to filtration and calculation in hydraulic constructions were proposed.

Head of the Department of Computational Mathematics of Kyiv University Professor G. Polozhiy has modeled conformal reflections on electrically conductive paper. Head of Dnipropetrovsk department of the Institute of Mechanics of the Academy of Sciences of the USSR, corresponding member V. Lazaryan was solving the problem of modeling the transient modes of the core systems and the problems of rolling stock on the railway. At the Institute of Geotechnical Mechanics of the USSR Academy of Sciences, corresponding member of the USSR Academy of Sciences F. Abramov worked in the field of electrical modeling of mine ventilation networks.

The development of the direction related to mathematical and electronic modeling of processes and systems in power engineering, started in the laboratories of the Institute of Electrical Engineering and the Institute of Electrodynamics, led to the formation of the academic school of electronic modeling academician G. Pukhov. Scientist for about 40 years worked in the Academy of Sciences of the USSR, developing and researching original electromodeling circuits, which made it possible to create analog machines for solving various systems of algebraic, differential and integral equations. The fruitful activity of G. Pukhov became the basis for the creation in Ukraine of the unique specialized scientific institution to study modeling problems in power engineering – the Institute for Modeling in Energy Engineering Academy of Sciences of the Ukrainian SSR.