

# Heat and Energy Consumption Management of a Public Object

S. Sh. Ixanov<sup>1,2</sup>, Zh. Kh. Zhunussova<sup>1,2,\*</sup>, V. V. Nikulin<sup>3</sup> and K. Kh. Zhunussov<sup>4</sup>

<sup>1</sup>Institute of mathematics and mathematical modeling, 050010, Almaty, Republic of Kazakhstan

<sup>2</sup>Al-Farabi Kazakh National University, 050040, Almaty, Republic of Kazakhstan

<sup>3</sup>State University of New York, New York, USA

<sup>4</sup>Almaty University of Power Engineering and Telecommunications named after G. Daukeev, 050013, Almaty, Republic of Kazakhstan

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**Abstract:** The present paper addresses the effects of market and seasonal changes in the cost of heat and energy resources on the financial self-sufficiency of a public object. As an example, we take a college, the most important link in educational institutions of Kazakhstan. Computer experiments in the MathCad 15 and MatLab 6.5 environments substantiate the need to calculate the share of an energy-saving budgetary compensator, the adjustments of which will reduce the loss of unplanned funds during the period of sharp seasonal cold snaps and achieve the financial stability of the management object - the college. The calculated data allow it possible to predict the amplitude-frequency characteristics of the control signal for smoothing jumps and disturbances in the adaptive control system at the optimal time. This allows to ultimately save college money and spend part of it on additional financial support for the educational process and increase teachers' salaries. The results showed that the introduction of resource saving technologies (heat, electricity, utilities, staff) contributed to the sustainable development of the institution.

**Keywords:** Adaptive automated management system, Adaptive management, Computer simulation modeling, Heat consumption, Stability, The two-link adaptive control system.

## 1 Introduction

Education in the colleges of the Republic of Kazakhstan is an important and promising direction for improving the business and innovative education of the country's population. The management structure of colleges is based on private entrepreneurship. The competitive environment in the field of special pre-university education requires the effective use of all creative and material resources of the college whose ultimate goal is to train demanded middle-level specialists in the field of innovative economics and banking informational systems. The high quality training of specialists is the most important advantage in the work of the admission committee of a private college, which defines its financial and economic sustainability and the prospects for the development of the educational institution. One of the components that negatively affects the effectiveness of college management is the consideration of unpredictable external factors: different levels of training for students,

undifferentiated wages, spasmodic inflation of money, a reduction in the real incomes of teachers and higher tariffs for electricity, water, higher utility costs, etc. Computerization and informatization of teaching and educational processes, creation of modern microcontroller automated management of heat, electricity and other material resources of the college set the new tasks for adapting management of technical and economic parameters and indicators of the educational process to the realities of modern society [1]. It should be noted that, among all colleges of the country, there is no example of a fully computerized college that meets the standards of the digital society. Therefore, the study and application of mathematical and computer analysis methods of sustainability colleges in the Republic of Kazakhstan as a management object are an actual and poorly investigated problem in the theory of control.

\* Corresponding author e-mail: [zhunussova777@gmail.com](mailto:zhunussova777@gmail.com)