1035-93-2018 **Anna S. Bulanova*** (ftasb1@uaf.edu), Department of Mathematics and Statistics, University of Alaska Fairbanks, Fairbanks, AK 99775-6660, and **Sergei A. Avdonin** (ffsaa@uaf.edu), Department of Mathematics and Statistics, University of Alaska Fairbanks, Fairbanks, AK 99775-6660. *Boundary Control approach to the spectral estimation problem.*

Let a signal $r(t)$ be modeled by the expression $r(t) = \sum_{n=1}^{N} a_n e^{\lambda_n t}$, where a_n and λ_n are arbitrary complex numbers. The classical spectral estimation problem is to recover a_n and λ_n, $n = 1, \ldots, N$, by the given observations $r(j)$, $j = 1, \ldots, 2N$. This problem is very important in signal processing and there exist many methods for solving it: the method of Proni and its numerous modifications, the Fourier–Laplace or **Z**–transform followed by the Pade approximation, and others. We propose a new approach to this problem based on the "nonselfadjoint" version of the Boundary Control (BC) method (Avdonin S.A. and Belishev M.I., Boundary control and dynamical inverse problem for nonselfadjoint Sturm–Liouville operator, *Control and Cybernetics* **25**, 429–440, 1996). Our approach has several advantages over previous methods, namely: (i) it allows to consider signals of the form $r(t) = \sum_{n=1}^{N} a_n^{m_n}(t) e^{\lambda_n t}$; (ii) it is applicable to some kinds of irregular (nonuniform) sampling problems. Note that N may be unknown and can be found in the procedure. We can also treat the case $N = \infty$. (Received September 21, 2007)