

RENEWAL OF A MULTI-PARAMETRIC SPECTRAL PROBLEM WITH GIVEN EIGEN VALUES AND EIGEN ELEMENTS

Abstract

In the paper, the inverse multi-parametric problem is investigated in the following form: for the given sequence of eigen values $\{(\lambda_{1,n}, \lambda_{2,n}, \dots, \lambda_{m,n})\}_{n=1,2,\dots} \subset R_m$ with real coordinates and the sequences of appropriate given eigen elements

$$\{\Phi_n\}_{n=1,2,\dots} = \{\varphi_{1,n} \otimes \varphi_{2,n} \otimes \dots \otimes \varphi_{m,n}\}_{n=1,2,\dots} \subset H = H_1 \otimes H_2 \otimes \dots \otimes H_m$$

(where \otimes is a tensor product sign) we look for a family of compact self-adjoint permutation operators $K_{i,1}, K_{i,2}, \dots, K_{i,m}$ in the Hilbert space $H_i, i = 1; 2; \dots; m$ for which the given sequences $\{(\lambda_{1,n}, \lambda_{2,n}, \dots, \lambda_{m,n})\}_{n=1,2,\dots}$ and $\{\Phi_n\}_{n=1,2,\dots}$ are the complete sequences of eigen values and appropriate eigen elements of the problem

$$\begin{cases} \sum_{j=1}^m \lambda_j K_{i,j} \varphi_j = \varphi_i, & \varphi_i \in H \\ i = 1; 2; \dots; m \end{cases} .$$