İSTANBUL ANALYSIS SEMINARS

CRITERIA FOR EXISTENCE OF RIESZ BASES CONSISTING OF ROOT FUNCTIONS OF HILL OR 1D DIRAC OPERATORS

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Abstract: We study the system of root functions (SRF) of Hill operator

$$Ly = -y'' + vy$$

with a singular potential $v \in H_{per}^{-1}$ and SRF of 1D Dirac operator

$$Ly = i \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \frac{dy}{dx} + vy$$

with matrix L^2-potential $v = \begin{pmatrix} 0 & P \\ Q & 0 \end{pmatrix}$, subject to periodic or anti-periodic boundary conditions. Series of necessary and sufficient conditions (in terms of Fourier coefficients of the potentials and related spectral gaps and deviations) for SRF to contain a Riesz basis are proven.

This is a joint work with Boris Mityagin (Ohio State University, USA).

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