

1-D Schrödinger operators with δ' -interactions and the Krein-Stieltjes string.

Kostenko A. S.

(*Dublin Institute of Technology*)

duzer80@gmail.com

We investigate 1-D Schrödinger operators with δ' -interactions on a discrete set $X = \{x_n\}_{n=1}^\infty \subset [0, b)$, where $x_n \uparrow b$ and $b \leq +\infty$. Spectral properties of these operators are widely studied in the case $d_* := \inf_{n \in \mathbb{N}}(x_n - x_{n-1}) > 0$ (see [1]). In the case $d_* = 0$, it is only known that the corresponding minimal operator is self-adjoint if $b = +\infty$ [2].

We show that self-adjointness, lower semiboundedness, and discreteness correlate with the corresponding spectral properties of a certain class of Jacobi matrices. On the other hand, this class of matrices is closely connected with the Krein-Stieltjes string operators. Using this connection, we obtain necessary and sufficient conditions for the operators with δ' -interactions to be self-adjoint, lower semibounded, discrete in the case $d_* = 0$.

References:

[1] *S. Albeverio, F. Gesztesy, R. Hoegh-Krohn, H. Holden*. Solvable Models in Quantum Mechanics, Sec. Edition, AMS Chelsea Publ., 2005.

[2] *D. Buschmann, G. Stolz, J. Weidmann*. One-dimensional Schrödinger operators with local point interactions// *J. Reine Angew. Math.*, V. 467. 1995. P. 169–186.

The talk is based on the joint work with M. M. Malamud.

The work is supported by IRCSET.