

On spectrum of operator Jacobi with exponentially increasing matrix elements in space with indefinite metric

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The class of three-diagonal Jacobi matrix with exponentially increasing elements is considered. Under some assumptions the matrix corresponds to unbounded self-adjoint operator in the weighted space $l_2(\omega)$ with scalar product $(x, y) = \sum_{k=1}^{\infty} \omega_k x_k \overline{y_k}$. The weight depends on elements of the matrix and in some cases can arise indefinite metric.

We proved that eigenvalue problem for this operator is equivalent to the eigenvalue problem of Sturm–Liouville operator with discrete self-similar weight. The asymptotic formulas for eigenvalues are obtained. These formulas differ for cases of definite and indefinite metrics.

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