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- **THE ESPECTRAL ANALYSIS OF FINITE‒DIFFERENCE OPERATORS OF SECOND ORDER (THE JACOBI MATRICES): CLASSICAL RESULTS**
- **THE DIRECT AND INVERSE PROBLEM OF SPECTRAL ANALYSIS FOR FINITE‒DIFFERENCE OPERATORS OF FORTH ORDER (FIVE‒DIAGONAL SYMMETRIC MATRICES)**
  Dr. Mikhail Kudryavtsev
  Universidad Nacional Autónoma de México

Abstract

The inverse spectral problems for finite‒difference operators of second order (three‒diagonal Jacobi matrices) are well known. One of the most important among them is the problem of the reconstruction of a finite or semi‒infinite Jacobi matrix by its spectral function. Thus, it would be interesting to extend these results for the finite‒difference operators of higher order. Is there any essential difference with the classical case of the Jacobi matrices?

We solve the direct and inverse problem of spectral analysis for finite and semi‒infinite five‒diagonal symmetric matrices. It turns out that, although the procedure of the reconstruction of the matrix by its spectral function looks similar to the three‒diagonal case, the description of possible spectral functions is absolutely different. We obtain the necessary and sufficient conditions for a matrix‒valued function to be the spectral function of a five‒diagonal matrix.

Further, we introduce a wider class of the five‒diagonal matrices: so‒called "possibly degenerated five‒diagonal matrices". In fact, namely this wider class is the analogous (from the spectral point of view)

to classical Jacobi matrices. This means that the description of their spectral functions is analogous to that of the classical three−diagonal case. We also provide complete solution of the direct and inverse problem of spectral analysis for "possibly degenerated matrices".

24 de abril de 2002.

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REDUCCIÓN DE SISTEMAS MECÁNICOS CON SIMETRÍA Y BIFURCACIONES DE EQUILIBRIOS RELATIVOS I Y II

Dr. Antonio Hernández Garduño
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Resumen

En esta serie de dos charlas se discutirá la técnica de reducción de sistemas hamiltonianos con simetría haciendo énfasis en el caso de reducción de aces cotangentes. Se discutirán algunos avances en teoría de reducción singular y algunos resultados en bifurcaciones de equilibrios relativos.

6 de marzo de 2002.