

**NON-COMMUTATIVE NORMAL FORMS AND INVERSE SPECTRAL PROBLEMS.**

ANATOLY ANIKIN

We discuss non-commutative analog for Birkhoff normal forms. This theory provides us with a new method for calculating asymptotic series of low lying eigenvalues of Schrödinger operator. We show that the approach may be useful for different reasons. Firstly, it enables to estimate the growth of the eigenvalues expansion coefficients, and secondly it may be efficient for practical calculations, e.g. for treating inverse problems. In particular, in the one-dimensional case under some restrictions we prove that the knowledge of asymptotic series for any pair of low lying eigenvalues is enough to recover the potential.

A. ISHLINSKI INSTITUTE FOR PROBLEMS IN MECHANICS OF THE RUSSIAN ACADEMY OF SCIENCES,  
101 PROSPEKT VERNADSKOGO, BLD. 1, 119526, MOSCOW, RUSSIA  
*E-mail address:* anikin83@inbox.ru