ON THE SPECTRAL PROPERTIES OF THE PERTURBED LANDAU HAMILTONIAN AND AND RELATED PROBLEMS IN ANALYSIS

G Rozenblum
Matematiska vetenskaper
Chalmers tekniska högskola och Göteborgs universitet
SE-412 96 Göteborg, Sweden

The Landau Hamiltonian describes the movement of an electron confined to a plane, under the influence of the constant orthogonal to the plane magnetic field. The spectrum of the corresponding operator consists of infinitely degenerate eigenvalues placed at the points of an arithmetic progression (called Landau levels). If the Landau system is subject to some perturbation then each Landau level splits (generally) into a cluster of eigenvalues with Landau level as their limit points. The quantitative description of such clusters reduces to the problem on the spectral behavior of Toeplitz operators in the Fock-Bargmann space. In the talk we discuss some new types of perturbations and the corresponding spectral problems for Toeplitz operators. In particular, we report on the most recent results about the finite rank problem: what kind of weight can produce a Toeplitz operator with finite rank.