

BERNSTEIN-TYPE INEQUALITIES FOR JACOBI POLYNOMIALS AND DISPERSION ESTIMATES FOR THE DISCRETE LAGUERRE OPERATOR

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ABSTRACT. The talk is focused on Bernstein-type estimates for Jacobi polynomials and their applications to various branches in mathematics. This is an old topic but we want to add a new wrinkle by establishing some intriguing connections with dispersive estimates for a certain class of Schrödinger equations whose Hamiltonian is given by the generalized Laguerre operator, i.e., the Jacobi matrix associated with generalized Laguerre polynomials. These operators feature prominently in the recent study of nonlinear waves in (2+1)-dimensional noncommutative scalar field theory since it appears as the linear part in the nonlinear KleinGordon and the nonlinear Schrödinger equations investigated in the recent works of Chen, Fröhlich and Walcher and Krueger and Soffer, respectively.

We show that dispersive estimates for the evolution group are connected with Bernstein-type inequalities for Jacobi polynomials. We use known uniform estimates for Jacobi polynomials to establish some new dispersive estimates. In turn, the optimal dispersive decay estimates lead to new Bernstein-type inequalities.

The talk is based on joint work with T. H. Koornwinder and G. Teschl.

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