1027-33-19 **Alexander V Turbiner*** (turbiner@nucleares.unam.mx), Instituto de Ciencias Nucleares, Universidad Nacional Autonoma de Mexico, Apartado Postal 70-543, 04510 Mexico City, DF, Mexico. *Multivariable polynomials and Lie algebras.* Preliminary report.

Eigenfunctions of the integrable Olshanetsky-Perelomov quantum Hamiltonians (rational and trigonometric), where the Calogero-Sutherland Hamiltonians are some particular cases, emerging in the Hamiltonian Reduction Method are multivariable polynomials. They are called the Jack polynomials. These Hamiltonians are related to the invariant Laplace operators on the orbits of semi-simple Lie groups. Taking invariants of the corresponding root space as new variables any of these Hamiltonians takes the algebraic form of a linear differential operator with polynomial coefficients. It can be shown that all A-B-C-D Olshanetsky-Perelomov Hamiltonians (rational and trigonometric) come from a single quadratic polynomial in generators of the maximal affine subalgebra of the gl(n)-algebra but unusually realized by the first order differential operators. The memory about A-B-C-D origin is kept in coefficients of the polynomial. For the case of exceptional E Olshanetsky-Perelomov Hamiltonians some unknown infinite-dimensional but finite-generated Lie algebras admitting finite-dimensional irreps appear. In such a formalism the polynomial eigenfunctions of any above-mentioned Hamiltonians occur as elements of finite-dimensional representation space of some Lie algebra. (Received December 31, 2006)