

Semiclassical analysis, loop group characters, and the modular group action

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Abstract

Quantized systems can display symmetry not arising from invariances of the underlying symplectic manifolds. One example of this type of "enhanced symmetry" is the appearance of modular invariance for characters of loop group representations; this group action does not arise from any known symmetry of the coadjoint orbit (though it does of course appear in conformal field theory). We show that a modular group action appears geometrically in the corresponding semiclassical category. This indicates that semiclassical analysis may make it possible to find enhanced symmetry in other situations where constructing the quantization may be difficult or unattainable.

Lecture 1: Geometric Quantization and the Weyl Character formula

Lecture 2: The symplectic category and its variants

Lecture 3: The symplectic category for quasi-Hamiltonian loop group spaces, the Kac character formula, and the modular group action.

(joint work with Victor Guillemin and Shlomo Sternberg)