

Vadim Gorin: Summary
(English translation of the Russian text)

**Probability measures related to representation theory and their
 q -deformations**

Representation theory of “big” groups (e.g. of the infinite-dimensional unitary group $U(\infty)$) has numerous links to statistical mechanics and probability theory. The correspondence between characters of $U(\infty)$ and probability measures on a certain class of stepped surfaces in \mathbb{R}^3 is an example of such a link (These surfaces, in turn, are in bijection with tilings of the halfplane by rhombuses of 3 types). The aforementioned probability measure possess a special Gibbs property which can be reformulated as uniformity of a certain conditional distribution.

Gibbs measures appear in the problems of statistical mechanics quite often and frequently much more complicated measures are used instead of the uniform one. In the present project we are mostly interested in measures which are 1-parametric deformations (quantizations) of the uniform measure.

In the recent preprint “The boundary of the q -Gelfand–Tsetlin graph, interpolation polynomials and q -Toeplitz matrices” of the author a q -deformation of the notion of the character of group $U(\infty)$ was introduced. The definition is based on the aforementioned statistical mechanics interpretation of the characters. The author proved the classification theorem for q -characters. The goal of the present project is further investigation of this q -deformation and other q -deformations in related models lying at the interface between representation theory and statistical mechanics. Let us describe some of the topics of future research:

1. Conjecturally, q -characters are related to the representation theory of quantum groups and this question needs additional investigations.
2. Theory of characters of $U(\infty)$ and related problems motivated construction of a number of probability models of the independent interest in the recent years. I plan to work it out whether these constructions can be generalized to q -case and what new phenomena appear.
3. It seems promising to generalize q -deformations from unitary group to other series of classical Lie groups and to symmetric group.