

# Representation of Probabilistic Data by Quantum-Like Hyperbolic Amplitudes

Andrei Khrennikov

**Abstract.** In this paper we study the problem of representation of statistical data of any origin by hyperbolic probabilistic amplitudes (normalized vectors in hyperbolic Hilbert space). It generalizes the conventional QM which is based on complex Hilbert space. We performed extended numerical simulation. Similar to the conventional quantum formalism for Bloch's sphere, we visualize results of simulation for a special class of statistical data on so called Bloch's hyperboloid. The notion of hyperbolic qubit is introduced.

**Keywords.** Representation of probabilistic data by hyperbolic amplitudes, Bloch's sphere, Bloch's hyperboloid.

Andrei Khrennikov  
International Center for Mathematical Modeling  
in Physics and Cognitive Sciences  
University of Växjö, S-35195, Sweden  
e-mail: [andrei.khrennikov@vxu.se](mailto:andrei.khrennikov@vxu.se)

Received: March 11, 2008

Accepted: June 04, 2008