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String theory: orbifold geometry, moduli spaces of WZNW models and ergodic optimization

We investigate symmetry and integrability properties of string theory by using the categorification of geometric and analytical structures of the theory and arithmetization some of them for investigating the spectral statistics of quantized integrable systems.

In the framework of Wess-Zumino-Novikov-Witten models we investigate the class of exact string theory backgrounds. Classes of exact string theory backgrounds have investigated in works by E. Kiritsis and C. Kounnas [1], by M.J. Reboucas and J. Tiomno [2], by D. Israel [3], by H. Verlinde [4], by G. Barnich and F. Brandt [5], by M. Atiyah and E. Witten [6], by T. Eguchi and Y. Sugawara [7], by A. Popov [8], and by D. Orlando [9]. Category theory and homological algebra part of the talk is the continuation of my papers [10,11]. From integrable models we obtain dynamical systems.

The second part of my talk is concerned with ergodic optimization. In the case we will consider the real part of the string theory backgrounds only. Let f be a real valued function defined on the phase space of a dynamical system. Ergodic optimization is the study of invariant probability measures, whose ergodic f – average is large as possible. By the Krylov-Bogolioubov theorem for a non-empty compact metric space X and continuous T: $X \to X$, the set of all T-invariant Borel probability measures on X is non-empty. In the part of our communication we established, follow to T. Bousch, O. Jenkinson and another researchers some aspects of ergodic optimization in the framework the real part of the string theory backgrounds. Numerical examples are included.

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