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Wess-Zumino-Witten models and path integrals.

The Wess-Zumino-Witten (WZW) model is a 2 dimensional conformal field theory (CFT) where the field takes values in a Lie group G or its coset space. For a compact group G this CFT is rational and its cosets G/H include for instance all unitary rational CFTs (e.g. the two dimensional Ising model). WZW model has a formal path integral representation whose rigorous construction has remained elusive and in fact most of its conjectured properties have been discussed using the representation theory of affine Lie algebras. In this talk I will review the basic facts about the path integral formulation of WZW models and then discuss the coset theory SL(2,C)/SU(2). This theory can be formulated in terms of field taking values in the 3-dimensional hyperbolic space and it has been studied as one of the simplest realisations of the AdS/CFT correspondence. By the work of Ribault, Teschner, Hikida and Schomerus it has also been argued to have a mapping to the Liouville CFT which is the basic building block of two dimensional quantum gravity and random surface theory. This map has been argued to provide a "quantum"deformation of the geometric and analytic Langlands correspondence. I will explain briefly how this theory can be constructed probabilistically using the theory of Gaussian Multiplicative Chaos and how in a very general setup the correlation functions of its primary fields can be mapped to those of the Liouville CFT.