

Analytical analysis of the bosonic Lorentzian IKKT matrix model with a mass term

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The IKKT matrix model was conjectured to provide a non-perturbative definition of the type IIB string theory. One of the most attractive features of this model is that spacetime emerges dynamically by interpreting the matrix degrees of freedom as ten-dimensional spacetime coordinates. There have been many numerical simulations suggesting the appearance of (3+1)-dimensional expanding universe. In the recent work [1], it was shown that the spacetime arising from the bosonic version of the model is Euclidean and complex. To realize a real Lorentzian spacetime, an additional mass term was then introduced. In this work, we investigate the bosonic Lorentzian IKKT matrix model with a mass term analytically. [1] K. Hatakeyama, K. Anagnostopoulos, T. Azuma, M. Hirasawa, Y. Ito, J. Nishimura, S. K. Papadoudis, and A. Tsuchiya, Complex Langevin studies of the emergent space-time in the type IIB matrix model, in East Asia Joint Symposium on Fields and Strings 2021, 1, 2022. arXiv:2201.13200.

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