

Tensor network based finite-size scaling for 2D classical models.

Monday, 25 March 2024 14:00 (1 hour)

In this talk, we discuss how to perform tensor network based finite-size scaling analysis for 2D classical models. We first use HOTRG to renormalize the weight tensor of the partition function, then we use renormalized tensor to construct the approximated transfer matrix of an infinite strip of finite width. By diagonalizing the transfer matrix we obtain physical quantities such as the correlation length, magnetization, and energy density. These quantities are used in finite-size analysis to estimate the critical temperature and critical exponents. We show that they can be determined accurately and the results can be systematically improved by increasing the bond dimension. Furthermore, we show that the conformal data can also be estimated accurately and the low energy part of the conformal tower can be accurately obtained.

Finally, we define an entanglement for the 2D classical models and the entanglement show expected scaling behavior, from which the central charge can be estimated.

Presenter: Prof. CHEN, Pochung (NHTU)

Session Classification: Invited talks