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Finite-size scaling of Lee-Yang zeros and its application to 3-state Potts model and heavy-quark QCD

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We propose a general procedure to use the finite-size scaling of Lee-Yang zeros (LYZ) for investigating critical points (CP). This method makes use of the multiple LYZ obtained on finite-volume simulations for determining the properties of the CP, such as the location, universality class, and axes to embed the scaling function.
We apply this method to the analysis of the CP in the 3-state Potts model and QCD in the heavy-quark regime, which are believed to belong to the same universality class as the 3D Ising model. In these models, a direct calculation of the partition function at complex parameters is possible using the reweighting method. By using the numerical results of the LYZ, we demonstrate that our method determines the location of the CP and t,h-axes of the Ising model in the parameter space of these models, for embedding the scaling function.

Primary authors: WADA, Tatsuya (Kyoto University/YITP); Prof. KANAYA, Kazuyuki (Tomonaga Center for the History of the Universe, Univ. Tsukuba); KITAZAWA, Masakiyo (Yukawa Institute for Theoretical Physics)

Presenter: WADA, Tatsuya (Kyoto University/YITP)

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