[Talk 21] Finite-size scaling and dynamic fluctuations in the Kuramoto model with generalized unimodal distribution of natural frequencies

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We investigate critical phenomena in the Kuramoto model with generalized unimodal distribution of random frequencies. In this work, the generalized unimodal distribution is given by $g_m(\omega) \sim 1/(|\omega|^m + \Gamma^m)$, which leads to the Cauchy-Lorentz distribution when $m = 2$. Varying m, we calculate critical exponents, and find that the order parameter exponent β and finite-size scaling exponent $\bar{\nu}$ are functions of m, given by $\beta = 1/m$ and $\bar{\nu} = 2 + 1/m$, respectively, whereas the dynamic fluctuation exponent $\gamma = 1$, independent of m.