Finite-χ scaling using CTMRG in the 2D classical Ising model

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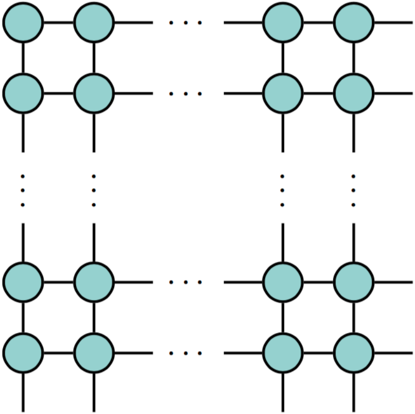
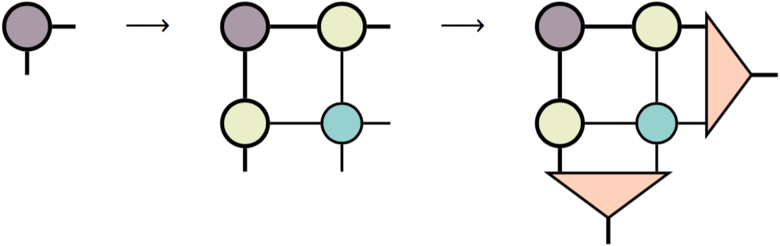
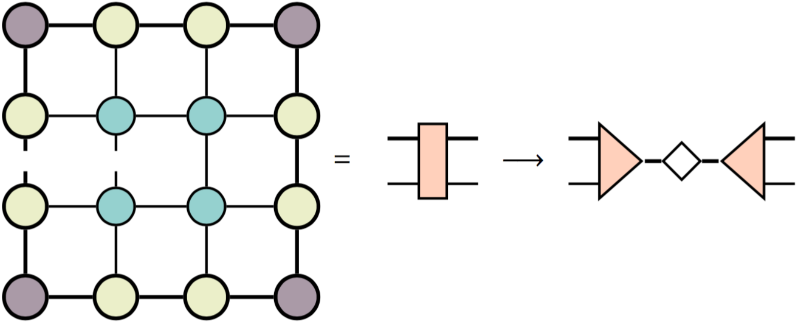


$$Z = \operatorname{Tr} A^4$$





R. J. Baxter 1982

If one keeps all such eigenvalues and eigenvectors, then the diagonal matrices A_d, B_d, C_d, D_d double in size at each recursion. However, we expect these to tend to infinite-dimensional limits. This is in the sense given in Section 13.4, namely that if their diagonal elements are arranged in numerically decreasing order, then any given such element (e.g. the 6th largest) should tend to a limit.

This suggests a self-consistent truncation of the equations, namely to keep only the larger half of the eigenvalues of $A_tB_tC_tD_t$, and the corresponding right- and left-eigenvectors. This means that we are solving the equations

$$\kappa P_r A_d = A_t Q_r , \tag{13.8.15a}$$

$$\kappa A_d Q_s = P_s A_t , \tag{13.8.15b}$$

$$Q_s Q_r = \mathcal{I} , \tag{13.8.16}$$

together with (13.8.14) and their rotated analogues.

R. Baxter 1978; R. Baxter 1968

Let $\psi(\sigma)$ be the element σ of the vector ψ. Remembering that σ denotes the m spins $\sigma_1, \ldots, \sigma_m$, this can be written more explicitly as $\psi(\sigma_1, \ldots, \sigma_m)$. For reasons that will be given in Section 5, I use the following "trial function" for ψ:

$$\psi(\sigma_1, \ldots, \sigma_m) = \mathrm{Tr}[F(\sigma_1, \sigma_2)F(\sigma_2, \sigma_3)F(\sigma_3, \sigma_4) \cdots F(\sigma_m, \sigma_1)] \qquad (11)$$

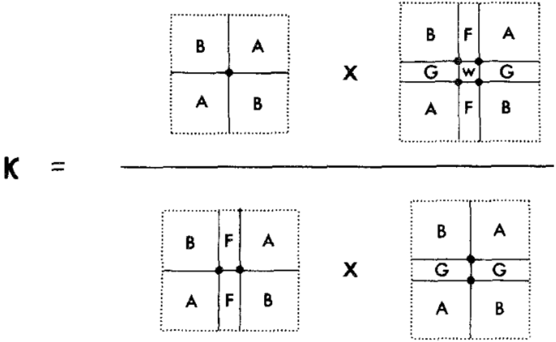
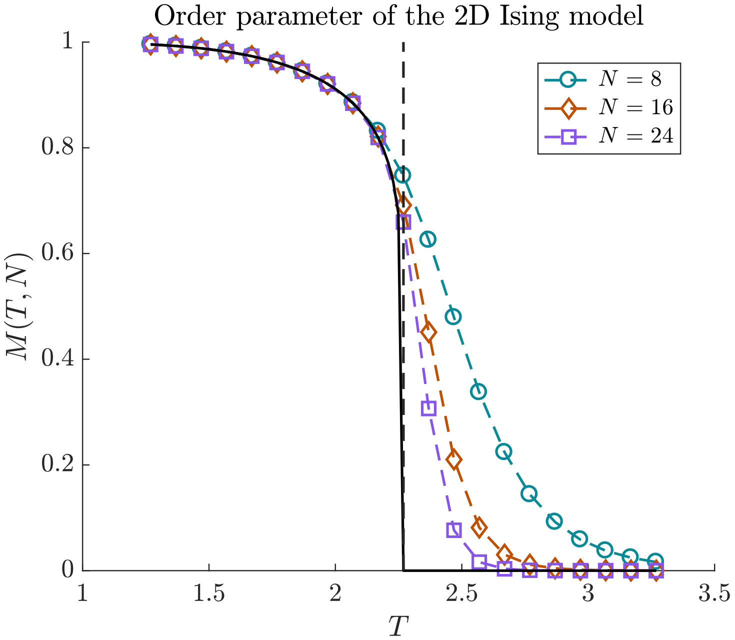


Fig. 5. Graphical representation of the variational expression (31) for κ.

Finite systems distort critical behaviour



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