The \( p, q \)-binomial distribution applied to the Ising model

PER HÅKAN LUNDOW, ANDERS ROSENGREN, KTH — Monte Carlo simulations have shown that the \( p, q \)-binomial distribution closely fits the magnetisation distribution for the \( d \)-dimensional Ising model at all temperatures when \( d > 4 \). It also fits well for some temperatures near \( T_c \) for \( d = 2, 3 \) and especially so for \( d = 4 \). At high and low temperatures, away from \( T_c \), the \( p, q \)-distribution always fits extremely well. However, it appears very difficult to determine how the parameters \( p \) and \( q \) depend on the temperature. From high and low temperature series expansions we can get partial results on their temperature dependence. Near \( T_c \) for \( d = 5 \) we have approximately that \( p = 1 - 0.0736/L^5 \) and \( q = 1 - 9.87/L^5 \) whereas for \( d < 5 \) the linear coefficient of \( q \) grows logarithmically. We show numerically how the parameters behave near \( T_c \) with increasing \( d \).

Per Håkan Lundow
KTH

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