# Ising model on plane: numerical solution

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**Abstract**

The critical two-dimensional Ising model is studied with four types boundary conditions: free, fixed ferromagnetic, fixed antiferromagnetic, and fixed double antiferromagnetic. Using bond propagation algorithms with surface fields, we obtain the free energy, internal energy, and specific heat numerically on square lattices with a square shape and various combinations of the four types of boundary conditions. The calculations are carried out on the square lattices with size $N \times N$ and $30 < N < 1000$. The numerical data are analyzed with finite-size scaling. The bulk, edge, and corner terms are extracted very accurately. The exact results are conjectured for the corner logarithmic term in the free energy, the edge logarithmic term in the internal energy, and the corner logarithmic term in the specific heat. The corner logarithmic terms in the free energy agree with the conformal field theory very well.