1-D Ising-Modell ohne Magnetfeld $\boxed{H = -\sum_{ij} J_{ij} S_i S_j}$

$Z_N = 2^N \cosh^{N-1}(\beta J) \qquad M(T) = \mu \lim_{j\to\infty} \tanh^{j/2}(\beta J)$

1-D Ising-Modell mit Magnetfeld $\boxed{H = -\sum_{ij} J_{ij} S_i S_j - \vec{\mu}\vec{B} \sum_i S_i}$

$$Z_N \overset{N\to\infty}{=} \lambda_1^N = e^{\beta J N} \left[\cosh(\beta\mu B_0) + \sqrt{\sinh^2(\beta\mu B_0) + e^{-4\beta J}}\right]^N$$

$$M = -\frac{\partial F}{\partial B_0} = \frac{N\mu \sinh(\beta\mu B_0)}{\sqrt{\sinh^2(\beta\mu B_0) + e^{-4\beta J}}} \qquad \chi_T = \frac{\mu_0 \partial M}{\partial B_0}\bigg|_{B_0=0} = \frac{\mu_0 \mu^2 N e^{\frac{2J}{k_B T}}}{k_B} \frac{1}{T}$$