

# $n$ -Point Functions for the Rectangular Ising Ferromagnet

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**Abstract.** A new representation for the  $n$ -point functions of the Planar Ising ferromagnet is given. Below the critical temperature the boundary conditions are toroidal; the state is a superposition of the extremal invariant ones, with equal weights.

## 1. Introduction

This paper presents the final results which are needed to write down the  $n$ -point function of the rectangular Ising ferromagnet in an explicit way. As was explained in the first paper [1], this can be done once all matrix elements of spin operators between any eigenvectors of the transfer matrix have been given. In [1] and [2], matrix elements from the vacua to any excited state were considered. The method for completing the problem is quite obvious, but the fact that a Wick theorem still obtains is not; it is also highly significant for the truncation properties of the  $n$ -point functions [3]. The results of this series of papers have found application in the rigorous determination of critical indices [4], in heuristic remarks on the equation of state [5] and in the analysis of the density profile between phases [6].

## 2. Generalised Matrix Elements

Let functions associated with the generalised matrix elements be defined by

$$\begin{aligned}
 & F((e^{i\beta})_m | (e^{i\alpha})_{m+1, n}) \\
 &= M^{n/2} \exp i \left\{ \sum_1^m (\beta_j + \theta(\beta_j)) + \sum_{m+1}^n (\alpha_j + \theta(\alpha_j)) \right\} \\
 & \cdot \langle \Phi_- | G_{\alpha_n} \dots G_{\alpha_{m+1}} G_{-\beta_m}^+ \dots G_{-\beta_1}^+ | \Phi_+ \rangle.
 \end{aligned} \tag{2.1}$$

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