

Analytic finite size corrections for the density matrix of the XXZ-Heisenberg chain

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Abstract

We derive a multiple integral representing the ground state density matrix of a segment of length m of the XXZ spin chain on L lattice sites, which depends on L only parametrically. This allows us to treat chains of arbitrary finite length. Specializing to the isotropic limit of the XXX chain we show for small m that the multiple integrals factorize. We conjecture that this property holds for arbitrary m and demonstrate the efficiency of our formula by computing the next-to-nearest neighbour zz -correlation function for chain lengths ranging from two to macroscopic numbers.

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