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Some mysteries of integrability: Q matrices, correlations and susceptibilities

Barry M. McCoy
C.N. Yang Institute of Theoretical Physics
State University of New York
Stony Brook, NY 11794
USA

mccoy@max2.phyics.sunysb.edu

Abstract

I will discuss several well known aspects of integrability which actually contain many mysteries. The first is the Q matrix of the 8 vertex model which at roots of unity has multiple definitions. The second is the correlation functions of the Ising model which have many properties which have been uncovered by computer computations for which no analytic derivations done by hand have been found. The final topics are the susceptibilities, both bulk and diagonal, of the Ising model and the extension to the analyticity properties of the free energy at $H \neq 0$.