Strong-interaction approximation for transfer-matrix method

O. Zaburannyi

Institute for Condensed Matter Physics, 1 Svientsitskyi Str., Lviv, Ukraine, E–mail: zab@icmp.lviv.ua

Using transfer-matrix method a correspondence between classical two-dimensional spin systems (two-dimensional Ising model and six-vertex model) and one-dimensional quantum spin systems is considered. We find the transfer matrix in two limits – in a well-known strong-anisotropy limit and a novel strong-interaction limit. In contrast to the usual strong-anisotropy approximation, within the strong-interaction approximation we take into account the non-commutativity of transfer-matrix components. The latter approximation is valid for low temperatures or strong interaction in one spatial dimension. We observe that the Hamiltonian of the corresponding quantum chains contains multispin interactions.