1016-33-248   **Vladimir Fokin*** (`vvf@math.iupui.edu`), Department of Mathematical Sciences, 402 N. Blackford st., #270, Indianapolis, IN 46202. *Exact Solution of the Six-Vertex Model with Domain Wall Boundary Condition. Disordered Phase.*

The six-vertex model, or the square ice model, with domain wall boundary conditions (DWBC) has been introduced and solved for finite N by Korepin and Isergin. The solution is based on the Yang-Baxter equations and represents the free energy in terms of an $N \times N$ Hankel determinant. Paul Zinn-Justin observed that the Isergin-Korepin formula can be expressed in terms of the partition function of a random matrix model with a nonpolynomial interaction. We use this fact to obtain the large N asymptotics of the six-vertex model with DWBC in the disordered phase. The solution is based on the Riemann-Hilbert problem approach and the Deift-Zhou nonlinear steepest descent method. As was noticed by Kuperberg, the problem of enumeration of alternating sign matrices (ASM) is a special case of the the six-vertex model. We compare the asymptotics for the six-vertex model with the known exact results for the ASMs. (Received February 13, 2006)