

Report for: *The free energy function of Ising model in a strong magnetic field*,
by Nguyen Tong Xuan

I. General comments

- In this paper, the author studies the analytic domain of the free energy function for the nearest-neighbor Ising model. The domain of convergence is shown, numerically, to be larger than those reported in recent results presented in Velenik's book. The proof is based on the celebrated cluster expansion method, incorporating new insights by Fernandez and Procacci.

- In my opinion, the paper deserves to be published in the Quy Nhon University Journal of Science. Below, I provide specific comments related to the presentation of the paper.

II. Detailed comments

- (1) Page 4, after introducing the definition of 'plus' boundary, you should also introduce corresponding notations such as H^+ and Z^+ .
- (2) Page 4, The notation \mathcal{E}_Λ^b is not appeared in Eq. (10).
- (3) Page 4, the $\|\cdot\|_1$ should be replaced by $\|\cdot\|_\infty$.
- (4) Page 4, I do not see the shaded area and the 8 polymers in the picture.
- (5) Page 5, in Theorem 2.1, is $+1$ -boundary is the $+$ -boundary?
- (6) Page 5, in Theorem 2.1, please explain the notation $G \in \mathcal{C}[n]$.
- (7) Page 5, in Theorem 2.2, please explain the notation $V(1)$.
- (8) Page 5, in Theorem 2.2, what is $|\Gamma_S|(\mathbf{w}_{\beta,h})$?
- (9) Page 7. The text "condition 30" should be "condition (30)".
- (10) Page 9, in Lemma 4.4, recall the definition of \mathcal{A}_k .