## MATHEMATICAL THEOREMS

Please see the reference part.

## References

- [1] Cai, T. T. and Guo, Z. (2015). Confidence intervals for high-dimensional linear regression: Minimax rates and adaptivity. arXiv preprint arXiv:1506.05539.
- [2] Chatterjee, S. and Shao, Q.-M. (2011). NONNORMAL APPROXIMATION BY STEIN'S METHOD OF EXCHANGEABLE PAIRS WITH APPLICATION TO THE CURIE—WEISS MODEL. The Annals of applied probability, pp. 464–483.
- [3] Chen, L. H. Y., Fang, X. and Shao, Q.-M. (2013). Moderate deviations in Poisson approximation: a first attempt. Statist. Sinica, 23(4), pp. 1523–1540.
- [4] Chen, W.-K. (2015). Variational representations for the Parisi functional and the two-dimensional Guerra-Talagrand bound. arXiv preprint arXiv:1501.06635.
- [5] Fontes, L. R., Mathieu, P. and Picco, P. (2000). On the averaged dynamics of the random field Curie-Weiss model. Ann. Appl. Probab., 10(4), pp. 1212–1245.
- [6] Fowler, R. H. and Rushbrooke, G. S. (1937). An attempt to extend the statistical theory of perfect solutions. Trans. Faraday Soc., 33, pp. 1272–1294.
- [7] Götze, F. (1987). Approximations for multivariate U-statistics. Journal of multivariate analysis, 22(2), pp. 212–229.
- [8] Harper, A. J. (2009). Two new proofs of the Erdös-Kac Theorem, with bound on the rate of convergence, by Stein's method for distributional approximations. In Mathematical Proceedings of the Cambridge Philosophical Society, vol. 147, pp. 95–114, Cambridge University Press.
- [9] Hoeffding, W. (1948). A class of statistics with asymptotically normal distribution. The annals of mathematical statistics, pp. 293–325.
- [10] Iacobelli, G. and Külske, C. (2010). Metastates in finite-type mean-field models: visibility, invisibility, and random restoration of symmetry. J. Stat. Phys., 140(1), pp. 27–55.
- [11] Li, B. and Solea, E. (2017). A nonparametric graphical model for functional data with application to brain networks based on fMRI. Journal of the American Statistical Association, (just-accepted).
- [12] Linnik, Y. V. and Mitrofanova, N. (1963). On the asymptotic distribution of maximum likelihood estimates. Doklady Akademii Nauk SSSR, 149, pp. 518– 520.
- [13] Löwe, M. and Meiners, R. (2012). Moderate deviations for random field Curie-Weiss models. J. Stat. Phys., **149**(4), pp. 701–721.
- [14] Löwe, M., Meiners, R. and Torres, F. (2013). Large deviations principle for Curie-Weiss models with random fields. J. Phys. A, 46(12), pp. 125004, 10.
- [15] Luk, H. M. (1994). Stein's method for the Gamma distribution and related statistical applications. ProQuest LLC, Ann Arbor, MI, thesis (Ph.D.)—University of Southern California.

- [16] Mathieu, P. and Picco, P. (1998). Metastability and convergence to equilibrium for the random field Curie-Weiss model. J. Statist. Phys., **91**(3-4), pp. 679–732.
- [17] McLachlan, G. and Krishnan, T. (2007). The EM algorithm and extensions, vol. 382. John Wiley & Sons.
- [18] Michel, R. and Pfanzagl, J. (1971). The accuracy of the normal approximation for minimum contrast estimates. Zeitschrift für Wahrscheinlichkeitstheorie und Verwandte Gebiete, **18**(1), pp. 73–84.
- [19] Petrov, V. V. (1975). Sums of independent random variables. Springer-Verlag, New York-Heidelberg, translated from the Russian by A. A. Brown, Ergebnisse der Mathematik und ihrer Grenzgebiete, Band 82.
- [20] Pfanzagl, J. (1971). The Berry-Esseen bound for minimum contrast estimates. Metrika, 17(1), pp. 82–91.
- [21] Roberts, J. K. (1938). Some properties of mobile and immobile adsorbed films. Proceedings of the Cambridge Philosophical Society, **34**, p. 399.
- [22] Salinas, S. R. and Wreszinski, W. F. (1985). On the mean-field Ising model in a random external field. J. Statist. Phys., 41(1-2), pp. 299–313.
- [23] Simon, B. and Griffiths, R. B. (1973). The  $(\phi^4)_2$  field theory as a classical Ising model. Comm. Math. Phys., **33**(2), pp. 145–164.
- [24] Stein, C. (1972). A bound for the error in the normal approximation to the distribution of a sum of dependent random variables. In Proceedings of the Sixth Berkeley Symposium on Mathematical Statistics and Probability, vol. 2, pp. 583–602, Berkeley: University of California Press.
- [25] Tenenbaum, G. and Tenenbaum, G. (1995). Introduction to analytic and probabilistic number theory, vol. 46. Cambridge university press Cambridge.