Jormungandr - Reading Notes

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1 Initial Reading

Summary of [1].

Types of recovery:

1. Exact

2. Almost Exact

3. Partial

4. Weak

For 2 balanced communities in a SSBM (Symmetric SBM) once can apply linear algebra pproaches to solve efficiently. But for more communities, the state of the art is belief propagation.

Many properties are given as functions of the number of edges n. Therefore can maybe sub-partition graph to see how properties scale with n to fit the most appropriate model.

Best algorithm for Weak recovery is Belief Propagation (linear version in [2]).

Also in [3].

$$\mathcal{P}(||\Omega_i \cap S|/|) \tag{1}$$

References

[1] Emmanuel Abbe. "Community Detection and Stochastic Block Models: Recent Developments". In: *Journal of Machine Learning Research* 18.177 (2018), pp. 1–86. URL: http://jmlr.org/papers/v18/16-480.html.

[2] Emmanuel Abbe and Colin Sandon. "Achieving the KS threshold in the general stochastic block model with linearized acyclic belief propagation". In: *Advances in Neural Information Processing Systems*. Ed. by D. Lee et al. Vol. 29. Curran Associates, Inc., 2016, pp. 1334–1342. URL: https://proceedings.neurips.cc/paper/2016/file/6c29793a140a811d0c45ce03c1c93a28-Paper.pdf.

[3] Emmanuel Abbe and Colin Sandon. "Proof of the Achievability Conjectures for the General Stochastic Block Model". In: *Communications on Pure and Applied Mathematics* 71.7 (2018), pp. 1334–1406. DOI: https://doi.org/10.1002/cpa.21719. eprint: https://onlinelibrary.wiley.com/doi/pdf/10.1002/cpa.21719. URL: https://onlinelibrary.wiley.com/doi/abs/10.1002/cpa.21719.

[4] Emmanuel Abbe and Colin Sandon. "Recovering Communities in the General Stochastic Block Model Without Knowing the Parameters". In: *Advances in Neural Information Processing Systems*. Ed. by C. Cortes et al. Vol. 28. Curran Associates, Inc., 2015, pp. 676–684. URL: https://proceedings.neurips.cc/paper/2015/file/cfee398643cbc3dc5eefc89334cacd Paper.pdf.