

COMMUNITY DETECTION IN THE LABELLED STOCHASTIC BLOCK MODEL

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We consider the problem of community detection from observed interactions between individuals, in the context where multiple types of interaction are possible. We use labelled stochastic block models to represent the observed data, where labels correspond to interaction types. Focusing on a two-community scenario, we conjecture a threshold for the problem of reconstructing the hidden communities in a way that is correlated with the true partition. To substantiate the conjecture, we prove that the given threshold correctly identifies a transition on the behaviour of belief propagation from insensitive to sensitive. We further prove that the same threshold corresponds to the transition in a related inference problem on a tree model from infeasible to feasible. Finally, numerical results using belief propagation for community detection give further support to the conjecture.