

# Sufficient condition for quasi-optimality of degree-greedy algorithm in Configuration Model graphs

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Graphs constitute ubiquitous mathematical objects that find applications in biology, physics and communications. In this context, the study of maximum independent sets (i.e., maximum size subsets of vertices where no vertex is neighbor to any other) gains relevance. Here we give a sufficient condition to establish if an independent set constructing stochastic process finds a maximum independent set in a Configuration Model graph. To the best of our knowledge, this is the first result in this direction. We also use this to establish a practical sufficient condition for the degree-greedy algorithm run on a Configuration Model to find w.h.p. an independent set which contains the same proportion of vertices as one of maximum size, when the size of the graph tends to infinity. Using this condition, we find several relevant examples where it is met.