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Адаптивный рандомизированный алгоритм выделения сообществ в графах

Бакалаврская работа

Допущена к защите.
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Adaptive randomised algorithm for community detection in graphs

Bachelor's Thesis

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Оглавление

0.1. Размер возмущения

Коэффициент d отвечает за то, насколько сильно будет возмущаться центральная точка для получения следующих измерений. То есть, насколько k_n^+ и k_n^- будут отличаться от $\hat{k}_{n-1}$. Зависимость модулярности от размера возмущения при $f(Q,k) = -10\ln Q,\ \sigma = 500,\ k_0 = 10$ будет выглядеть следующим образом:

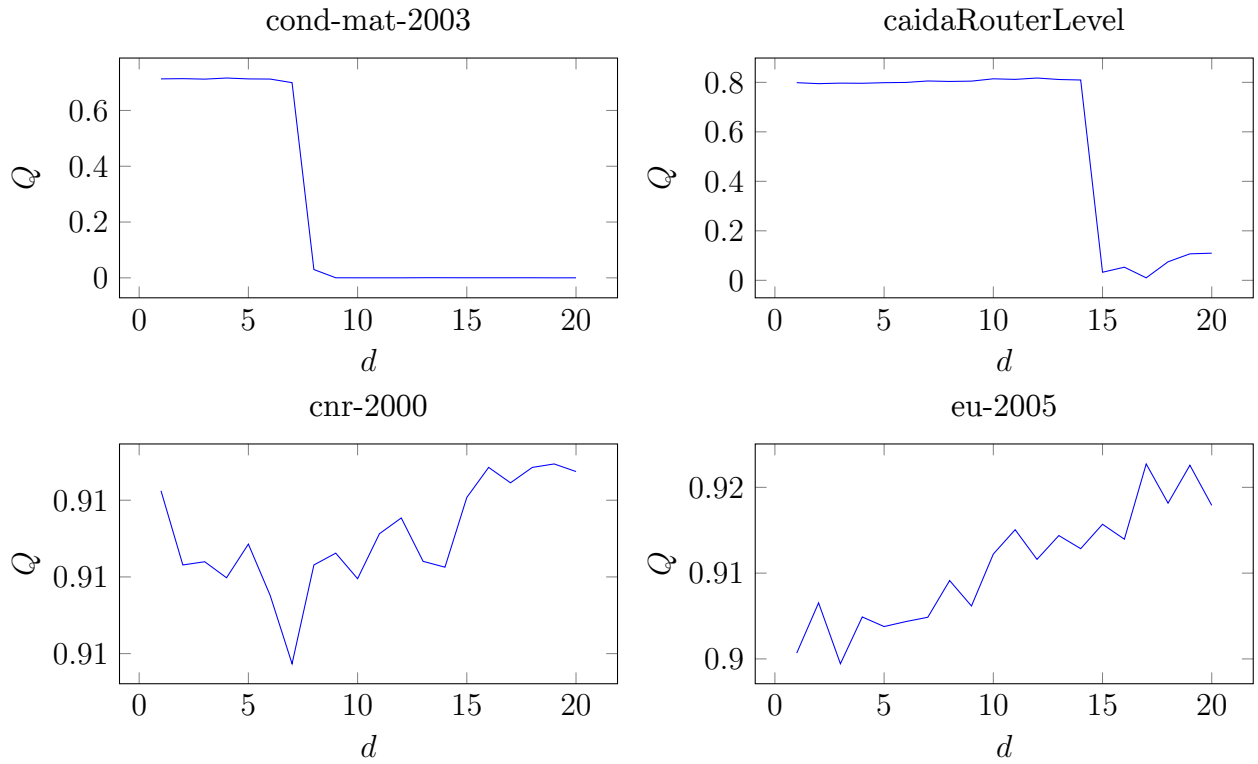
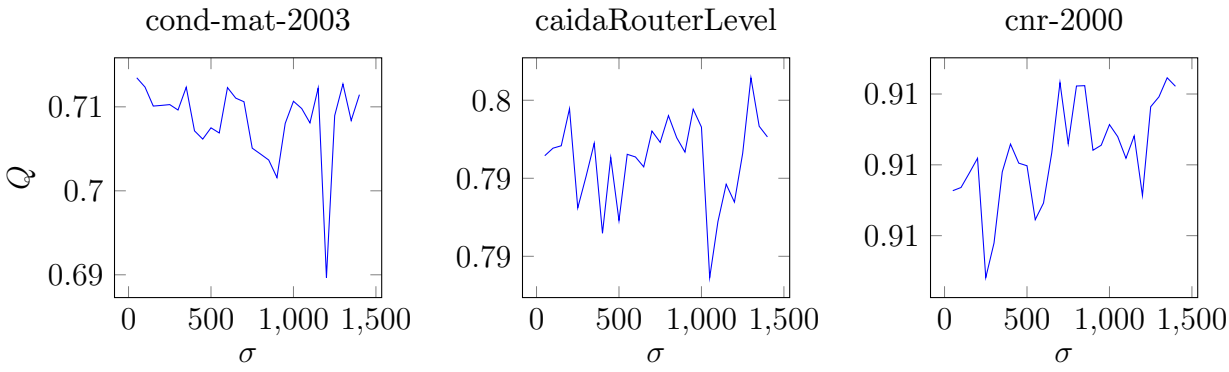


Рис. 1: Зависимость модулярности от размера возмущения на четырёх графах

На графах *cnr-2000* и *eu-2005* значения модулярности не очень сильно менялись в зависимости от параметра d, хотя некоторые значения d и давали более большие значения. Однако на графах *cond-mat-2003* и *caidaRouterLevel* после некоторого порогового значения возмущения модулярность показывала, что получившееся разбиение не лучше случайного.

0.2. Количество итераций в одном шаге

Параметр σ указывает, как часто меняется k в рандомизированного жадном алгоритме. Так как в функции качества используется медиана прироста модулярности, а не прирост модулярности за все σ шагов — при изменении σ нет необходимости менять функцию качества, модулярность прироста будет оставаться приблизительно такой же по величине, в то время как прирост модулярности линейно зависит от σ. Зависимость модулярности от количества итераций в одном шаге при $d = 5,\ f(Q,k) = -10\ln Q,\ k_0 = 10$ принимает такой вид:


cond-mat-2003
caidaRouterLevel
cnr-2000
Q
0.71
0.7
0.69
0.8
0.79
0.79
0.91
0.91
0.91
0
500
1,000
1,500
σ

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