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Summary: Lecture 11

Summary for the chapter *13.1* up to page 307. [1, 2]

Title

Content

Approximation

- to solve function problems
- optimization problems: find less than perfect answers
- ϵ for how many percent are *perfect*
- PTAS: how much do you care about the result? algorithm will adapt time to this

$$\frac{c(M(x)) - \mathrm{OPT}(x)}{c(M(x))} \leq \epsilon$$

Node Cover: Decision problem

Given: Graph $G = (V, E)$ and $k \in \mathbb{N}$

Is there a subset $V' \subseteq V$ with $|V'| \leq k$ such that every edge $e \in E$ contains a node from the subset V'?

Node Cover: Optimization problem

Given: Graph $G = (V, E)$ and $k \in \mathbb{N}$

Something else :D

Maximum Cut: Decision problem

Given: Graph $G = (V, E)$ and $k \in \mathbb{N}$

Is there a subset $V' \subseteq V$ such that there are at least k edges between $V \setminus V'$ and V'?

Maximum Cut: Optimization problem

Given: Graph $G = (V, E)$

Find the subset $V' \subseteq V$ such that there is the maximum number of edges between $V \setminus V'$ and V'?

TODO
Questions:

References

[1] Martin Berglund. *Lecture notes in Computational Complexity.*

[2] Christos H. Papadimitriou. *Computational Complexity.* Addison-Wesley Publishing Company, 1994.