Monthly Meeting on October

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1. Previous work
2. Progress
3. Next step

Last month

1. searched an (polynomial) algorithm to partition two matroids into their common bases
2. found an algorithm to find all common bases in two matroids in $O(n(n^2 + t)\lambda)$

References

Komei Fukuda, Makoto Namiki: “Finding all common bases in two matroids”, Discrete Applied Mathmatics 56 (1995) 231-243

Finding all common bases in two matroids

Main result

Given two matroids M_1, M_2, and a common base B^1, there is an algorithm finding all common bases of them in $O(n(n^2 + t)\lambda)$ where λ is number of the bases and t is time to make one pivot operation.

Finding all common bases in two matroids

alogrithm “Enumerate”

input: $M_1 := (E, \mathcal{B}_1)$, $M_2 := (E, \mathcal{B}_2)$, $B^1 \in \mathcal{B}_1 \cap \mathcal{B}_2$
output: all common bases of M_1 and M_2

1. $k := 1$, output B^k. $P := (R, ..., R)$. (Here, $P \in \{L, R\}^n$)
2. $f := min\{j \mid P_j = R\}$
3. If f doesn't exist, stop. Else, create $G := G(T_{M_1}(B^k), T_{M_2}(B^k))$ and find directed cycle C satisfying theorem 1 with breadth first search.
4. If C doesn't exist, goto step 2. Else, $k := k + 1$, make pivot operation along C and obtain new B^k, $T_{M_1}(B^k)$, and $T_{M_2}(B^k)$. $P_f := L$, $\forall j < k$; $P_j := R$, goto step 2.

1. Previous work
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next month

TODO:

1. learn about matroid intersecrion
2. learn how to partition a matoid into bases
3. tackle two different partition matroids (can be partitioned into their common bases)
4. generalized partition matroid of two different uniform matroids and any matroid