Algo3

Algorithm 1 Algo3

1: **INPUT:** $X, \mathcal{S}$ of size n, m and $t \in [1..n]$
2: **RESULT:** $\mathcal{P} = \{P_1, ..., P_t\}$ with P_* of size n/t
3: $\forall S \in \mathcal{S}, \pi(S) \leftarrow 1$
4: $\mathcal{P} \leftarrow \emptyset$
5: **for** $i \leftarrow 1$ to t **do**
6: $\quad P_i \leftarrow \emptyset$
7: $\quad E \leftarrow \text{pairs}(X)$
8: $\quad$ **for** $n/t - 1$ steps **do**
9: $\qquad \forall e \in E, \omega(e) \leftarrow \sum\limits_{S \in \mathcal{S}} \pi(S) I(e, S)$
10: $\qquad$ **if** $|P_i| = 0$ **then**
11: $\qquad\quad (x_j, x_k) \leftarrow$ arbitrary edge of minimum weight
12: $\qquad\quad P_i \leftarrow P_i \cup \{x_k, x_j\}$
13: $\qquad$ **else**
14: $\qquad\quad (x_j, x_k) \leftarrow$ arbitrary edge of minimum weight with $x_j \in P_i$ (or $x_k \in P_i$)
15: $\qquad\quad P_i \leftarrow P_i \cup \{x_k\}$ $(P_i \leftarrow P_i \cup \{x_j\})$
16: $\qquad$ **end if**
17: $\qquad \forall(u, v) \in P_i^2$ remove (u, v) from E #Remove edges between points in the partition
18: $\qquad \forall s \in \mathcal{S}, \pi(S) = \pi(S) - \pi(S) I((x_j, x_k), S)$ #Set weight of sets crossing the selected edge to 0
19: $\quad$ **end for**
20: $\quad \mathcal{P} \leftarrow \mathcal{P} \cup P_i$
21: $\quad X \leftarrow X \backslash P_i$
22: $\quad \forall S \in \mathcal{S}, \pi(S) = 2^{\sum\limits_{k=1}^{i} I(P_i, S)}$
23: **end for**
24: **return** $\mathcal{P}$