Minimum Cost Perfect Matching

March 24, 2017

Abstract

This is pseudocode for Minimum Cost Perfect Matching in Bipartite Graphs

---

Algorithm 3.3 Minimum Cost Perfect Matching in Bipartite Graphs

---

Input : Graph G = (V,E) with bipartition U,W where $|U|$ = $|W|$ and costs c.
Output: A minimum cost perfect matching M or a deficient set S

$$\vec{y_v} := \frac{1}{2} min \{c_e : e \in E\} \tag{1}$$

for all $v \in V$ *B*
while *Construct graph* H *with vertices* V *and edges*

$$\{uv \in E : c_u v = \vec{y_u} + \vec{y_v}\} \tag{2}$$

do
{
  if H *has perfect matching* M **then**
  {
    stop (M is a minimum cost perfect matching of G)
  }
}
Let $S \subseteq U$ be a deficient set for H *B*
if *all edges of* G *with an endpoint in* S *have an endpoint in* N_H*(S)* **then**
{
  stop (S is a deficient set of G)
}

$$\in := min \{c_{uv} - \vec{y_u} - \vec{y_v} : uv \in E, u \in S, v \notin N_H(S)\} \tag{3}$$

$$\vec{y_v} := \begin{cases} \vec{y_v} + \in & \text{for } v \in S \\ \vec{y_v} - \in & \text{for } v \in N_H(S) \\ \vec{y_v} & \end{cases} \tag{4}$$
