2026 Fall USTC Graph Theory Homework

Week12

Exercises

Exercise 1. Let G be Eulerian. The following is the efficient **Fleury algorithm** for finding an Eulerian circuit in G.

1. Set $P_0 = x_0$;

2. Suppose $P_i = x_0e_1x_1 \cdots x_{i-1}e_ix_i$ has been determined. Choose $e_{i+1} \in E(G) \setminus \{e_1, e_2, \cdots, e_i\}$ such that

(i) $e_{i+1} = x_ix_{i+1}$;

(ii) unless no other edge is available, e_{i+1} is not a bridge of $G_i = G - \{e_1, e_2, \cdots, e_i\}$.

3. When step 2 can no longer be carried out, stop.

(a) Prove that if G is Eulerian, the trail P constructed by Fleury's algorithm is an Eulerian circuit in G.