Exercise sheet 7

Visualization of Graphs

Exercise 1 – Simple Upward Planar Graphs

Prove or disprove that the following graph classes are upward planar:

a) directed acyclic graphs, whose underlying undirected graph is a simple cycle;

3 Points

b) directed acyclic graphs, whose underlying undirected graph is a tree. **3 Points**

Exercise 2 – Refinement of the Outer Face

Let $G = (V, E)$ be a directed acyclic graph with faces F and outer face f_0. Let $\Phi \colon \mathcal{S} \cup \mathcal{T} \to F$ be a consistent assignment of the large angles of the sinks and sources to the incident faces. We consider the situation in which the inner faces have been refined already, i.e., there exist no large angles on the inner faces anymore.

Show how you can complete the transformation into a planar st-graph by refining f_0.

4 Points

Hint: A possible intermediate step could be to first refine f_0 such that the sources and sinks of the graph form two disjoint intervals on the boundary of the outer face.