

Reconstruction of Staircase Polygons Visibility Graphs

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Talk Outline

1. Staircase Polygons' Visibility Graphs
2. Persistent Graphs. From Visibility Graphs to Persistent Graphs.
3. Our Research Problem

Staircase Polygon

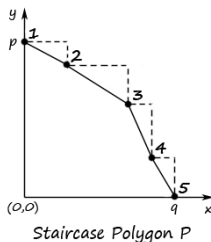
Definition

A "staircase looking path" that connects a point p on the positive y -axis to a point q on the positive x -axis is called a **staircase path**.

Definition

A **staircase polygon** is a staircase path together with the segments from the origin to p and the origin to q .

Example

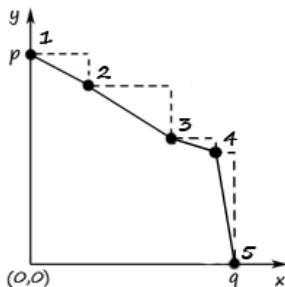


Visibility Graphs

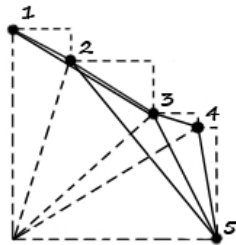
Definition

The **visibility graph**, $Vis(P)$, of a simple polygon P is the graph with $V(Vis(P)) = V(P)$ and whose edges correspond to internally visible pairs of vertices in P .

Example



Staircase Polygon P



Visibility Graph of P , $Vis(P)$

From Visibility Graphs to Persistent Graphs

Theorem

If P is a staircase polygon, then $\text{Vis}(P)$ is a persistent graph.

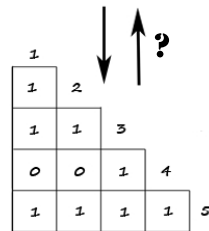
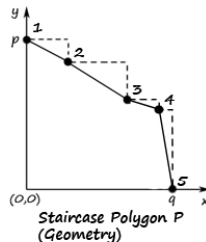
My Project

Input: A persistent graph G on n vertices

Output: A staircase polygon P such that $\text{Vis}(P)$ is isomorphic to G .

Main Ideas

1. Persistent graphs can be decomposed into special subgraphs called prime.
2. Solve the reconstruction problem for prime subgraphs.
3. Compose the prime solutions.



Persistent Matrix Of $\text{Vis}(P)$
(Graph Theory)

References

1. J. Abello, O. Egecioglu, K. Kumar, "Visibility Graphs of Staircase Polygons and the Weak Bruhat Order I: From Visibility Graphs to Maximal Chains" , Discrete and Computational Geometry, Vol. 14, No 3, 1995, pp 331-358.

QUESTIONS