

Point location and triangulation

1. Describe all the details of the linear time algorithm (especially the correctness) for triangulating a 1-sided monotone polygon.
2. Describe all the details for subdividing a simple polygon into 1-sided monotone polygon in $O(n \log n)$ steps.
3. In Kirkpatrick's decomposition, the depth of the data structure (the levelled Directed acyclic sub-graph) depends of the fraction of constant degree vertices that we an eliminate in each phase - we showed that this fraction α is at least $1/25$. Using more careful reasoning show that $\alpha \geq \frac{4}{70}$ by optimising the value of degree k to maximise the number of vertices eliminated.