

Problem Set 4

Due: Thursday, March 18, 2021

Problem 4.1 [Generically Speaking]. Show that any point set S can be transformed into a generic point set S' preserving the strict ordering of coordinates and approximately preserving OPT. More precisely, your construction should satisfy three properties:

- (a) No two points of S' share an x coordinate or share a y coordinate. (S' is *generic*.)
- (b) Each point $p \in S$ has a unique corresponding point $p' \in S'$ such that
 - i. if two points $p, q \in S$ satisfy $p.x < q.x$, then $p'.x < q'.x$; and
 - ii. if two points $p, q \in S$ satisfy $p.y < q.y$, then $p'.y < q'.y$.
- (c) $|\text{OPT}(S')| = O(|\text{OPT}(S)|)$.