Barbados 2011

Progress report session

Monday February 5th

1 Simultaneaous drawings without mapping

progress by Vida

Idea: try to restrict us to sub classes of planar graphs.

Counter example: 3 planar graphs with outer face given that cannot have a common embedding. All three graphes are an external triangle with n points inside, each point linked to two vertices of the main triangle. The inside degree of the vertices of the main triangle are $n, n, 0$ for G_1 $n, n/2, n/2$ for G_2 $2n/3, 2n/3, 2n/3$ for G_3.

2 Construct a subset of Delaunay

proposed by Nina

dimension d, points on a p-manifold.

Use quadtree to find k-nearest neighbors and compute locally small Delaunay triangles.

3 ♯ extreme points

progress by Xavier, Marc, Guillaume

Let D be a domain in $\mathbb{R}^2$

Let $f(n)$ expected number of extreme points amongst n points evenly distributed in D

Counter example: we have an example of non convex domain (3 cusps shape) where $f(n)$ goes to 3 when $n \to \infty$. Thus f is not an increasing (or even non decreasing) function.

Rk1: $f(n)/n \leq f(n-1)/(n-1)$

Rk2: Let $c_1(p) = \{q; q \notin CH(S),\ q \in CH(S \setminus \{p\})\}$ and $f_1(S) = \sum_{p \in S} |c_1(p)|$ Then $f(n) - f_1(n) = (f(n) - f(n-1))/n$

Rk3: for maximal points in a square (cube) we have a close formula and the number of maximal point is increasing.

Integral computations: Write $f(n) = nProb(X_0X_1 ccwedge of the convex hull)$ and write this proba as an integral. Then study $f(n+1) - f(n)$ and minorate.

4 Minimal triangulation

progress by Raimund

P simple polygon, T triangulation of the inside of P. Find a triangulation the inside of T of S such that $\sum_{u,v \in S} d_T(u,v)$.

Some progress using dynamic programming.

5 Minimum matching

progress by David

Particular case convex polygon with path inside.