# Barbados 2012

Progress report session 1

Monday February 6th

## 1 Triangle touching graph

**proposed by Stephen**

Report by Beppe.

Touching 3D boxes graph.

Tomassen has proved that all planar graph can be represented this way. Contacts has to be 2D.

Felssner has proved that you can do it with cubes. Contacts are 2D or 1D (conatct between edges of two cubes induce an edge of the graph).

Can we do with cubes and only 2d contacts ?

Report by Rahnuma

If the starting graph is an arrangement of lines, then we cn construct a TTG representation.

## 2 Distance between piecewise linear functions

**proposed by Guillaume**

Report by Guillaume

Potential result: $O(n^{2-\frac{1}{\kappa}})$ with $\kappa$ is some integer, may be 20.

We group the red triangles by group of size $l$.

A (blue) triangle can be represented by a point in $\mathbb{R}^9$.

A red triangle induces a subdivision in $\mathbb{R}^9$ (using 33 surfaces of degree 1, 2, or 3) to describe the intersection of a generic (blue) triangle.

For each group we compute the arrangement of $33l$ surfaces in $\mathbb{R}^9$ of size $\mathbb{R}^9$ and with a point location structure of size $\mathbb{R}^{14}$. For each cell we can compute a ratioanl function of degree $l$.

Then we locate all blue triangles in that sata structure and make parallel evaluation of the rational function for triangles lying in the same cell.

## 3 Separate points with $k$ lines

**proposed by Christian**

report by Xavier

Claim: A set of bicolored points not separable by two lines such that any proper set is separable by two lines as size greater than 6.

Examples :