Geometric Constraints April 13

Connected Rigidity Matroids and Unique Realization of Graphs

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Definitions:

- **Global Rigidity:** Generically has a unique realization.
- **Connected Matroid:** Matroid M is connected if it has atleast 2 elements and only one component.
- **Circuit/Cycle:** Removal of an edge will give the maximal independent set.
- **Node:** is a vertex with degree 3.
- **Feasible Node:** A node V is said to be feasible if G_v is a brick for some splitting G_v of G at V.
- **Splitting:**Inverse operation of 1-extension
- **1-extension:**The same as in previous discussions.
- **Edge Addition:** Take any 2 vertices without any edges and just put an edge between them.
- **Redundantly Rigid/2-Rigid:** Removing any one edge still leaves the graph Rigid.

Consider the following Statements

1. G is d+1 Connected
2. G is 2-Rigid
3. G can be obtained from K_4 by extensions.
4. G is globally rigid.

Some observations on these statements

- 2 implies 3 and 3 implies 2, *The first implication is shown in Theorem 6.1 in the paper. The second implication is shown in Lem 3.9 of the paper.*

  to be continued ...