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Seminar - Avoiding inessential edges

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I'll talk about a research project, joint work with Tejas Kalekar and Saul Schleimer, in which we used a number of different visualization techniques. A classical result says that any two triangulations of a three-manifold with the same number of vertices are connected to each other through a sequence of local combinatorial moves (namely, 2-3 and 3-2 moves). However, for some applications we need more from our triangulations - for example that all edges are essential. This means that you cannot deform any of the edges of the triangulation into a vertex. Is the subset of essential triangulations still connected by local moves? (Yes.)

The proof is very visual, mostly involving the dual structure to a triangulation, which we call a foam. We discovered that real-life soap films attached to a suitable 3D printed frame will perform the local moves when the frame is flexed. With Sabetta Matsumoto, Saul and I are working on a YouTube video exploring soap films, and our results.

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