Visualizing Geometric Proofs

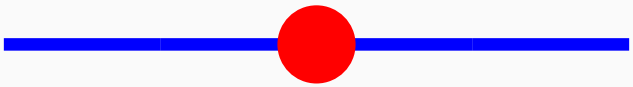
3D surface diagrams

Lukas Heidemann

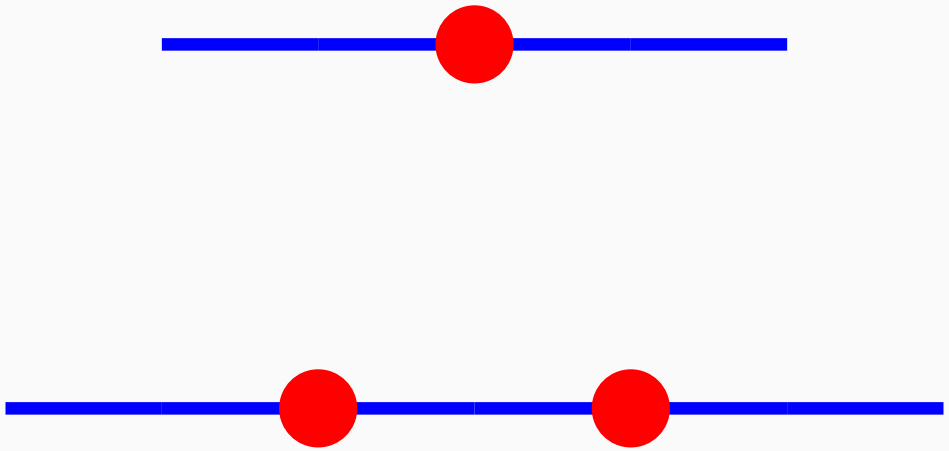
Diagrams

0-diagrams

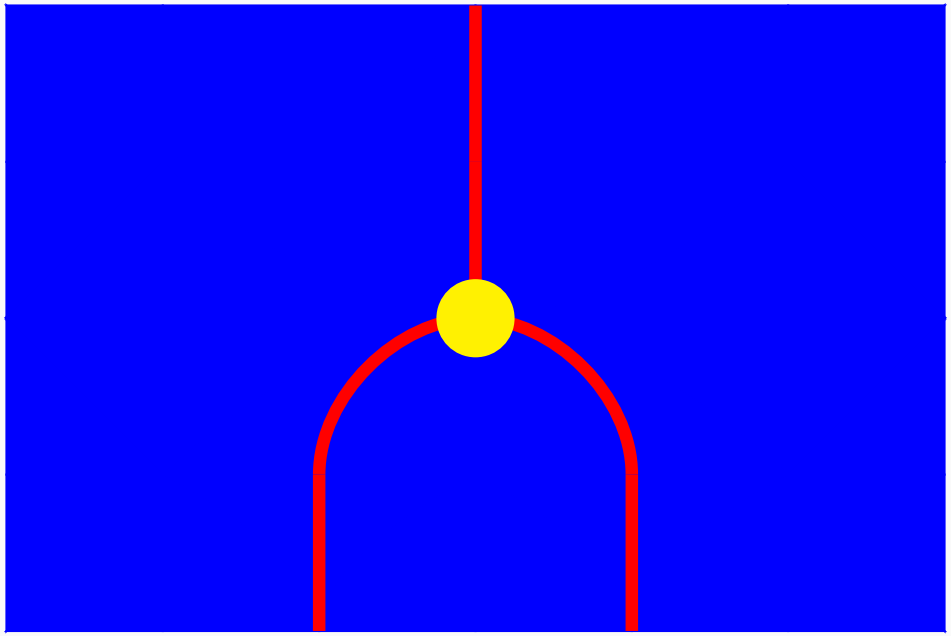
1-diagrams: bead diagrams



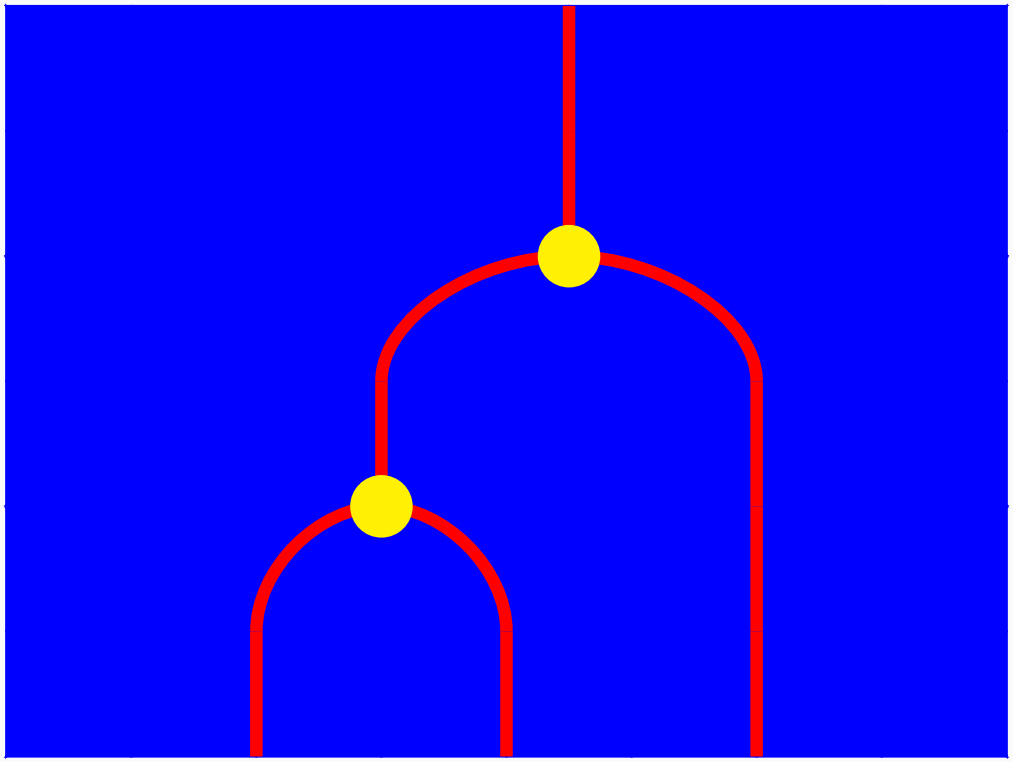
1-diagrams: bead diagrams



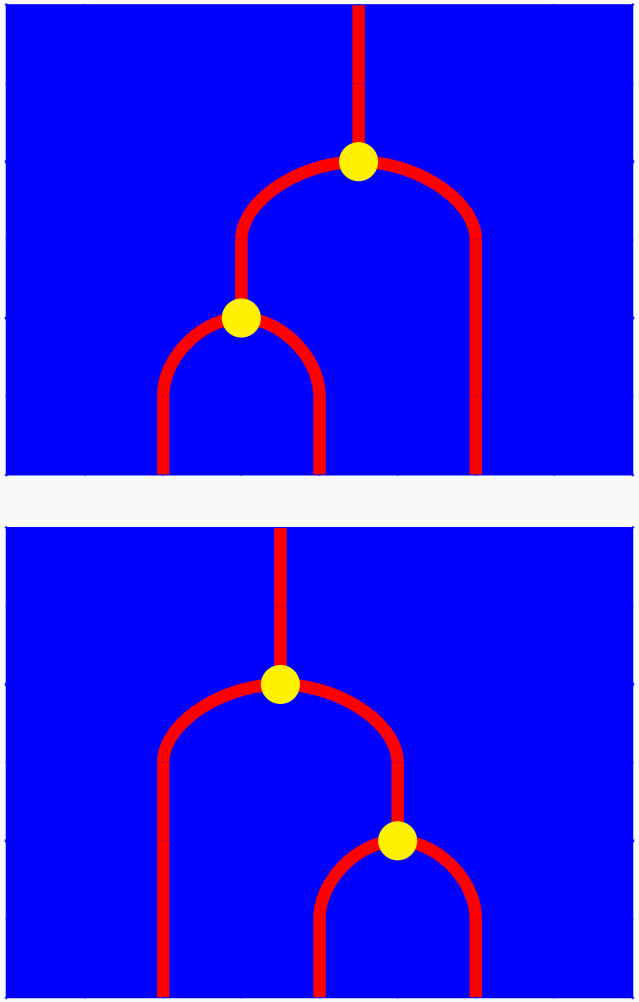
2-diagrams: string diagrams



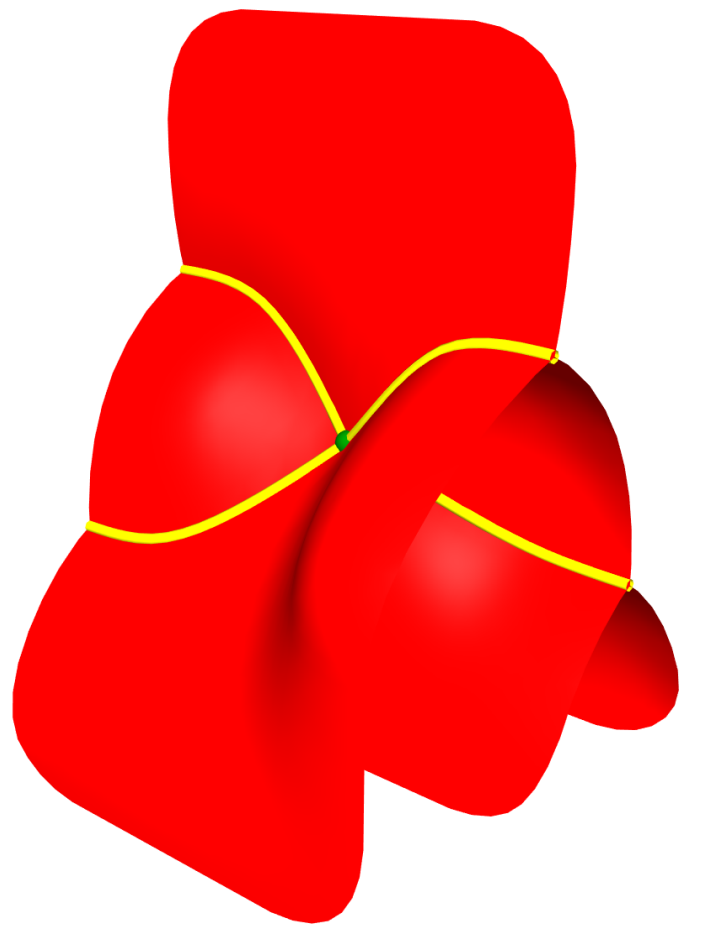
2-diagrams: string diagrams

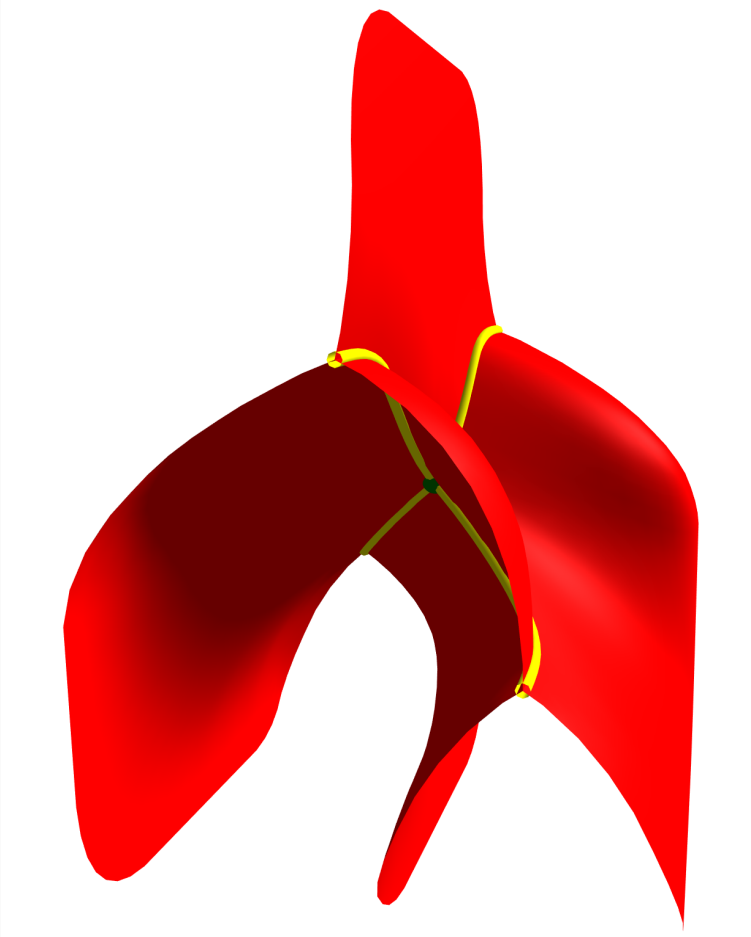


2-diagrams: string diagrams

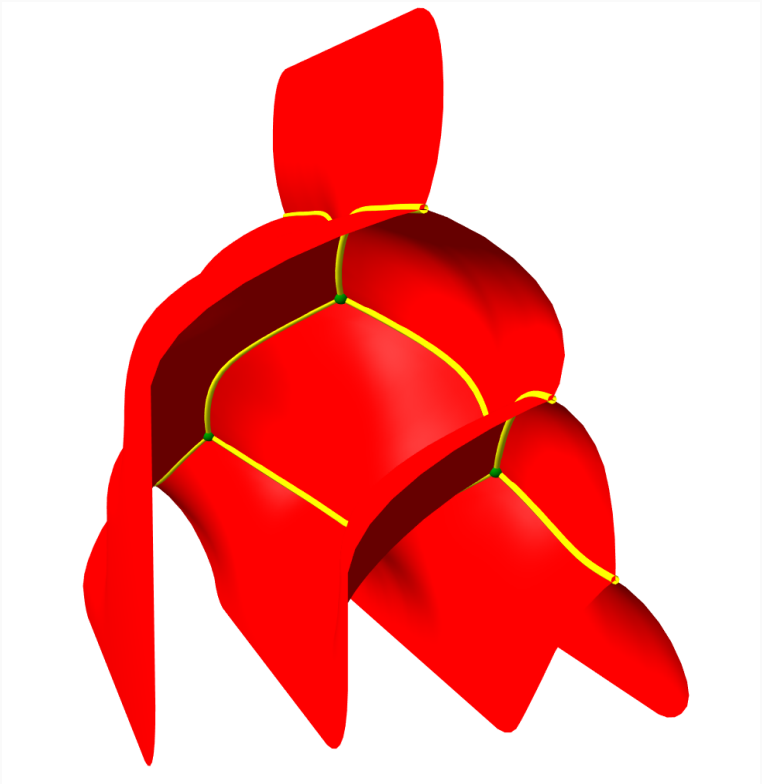


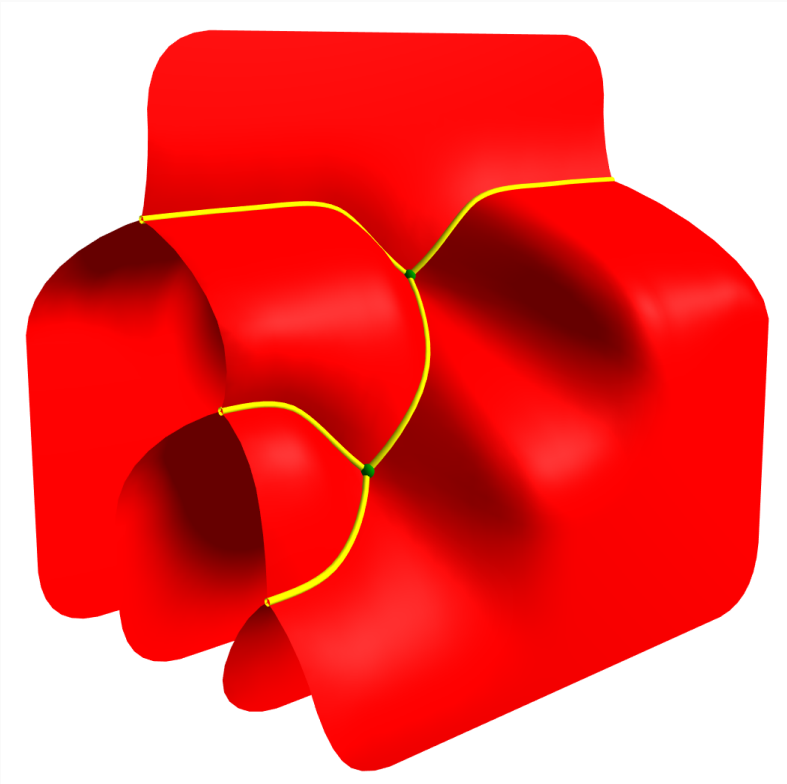
3-diagrams: surface diagrams



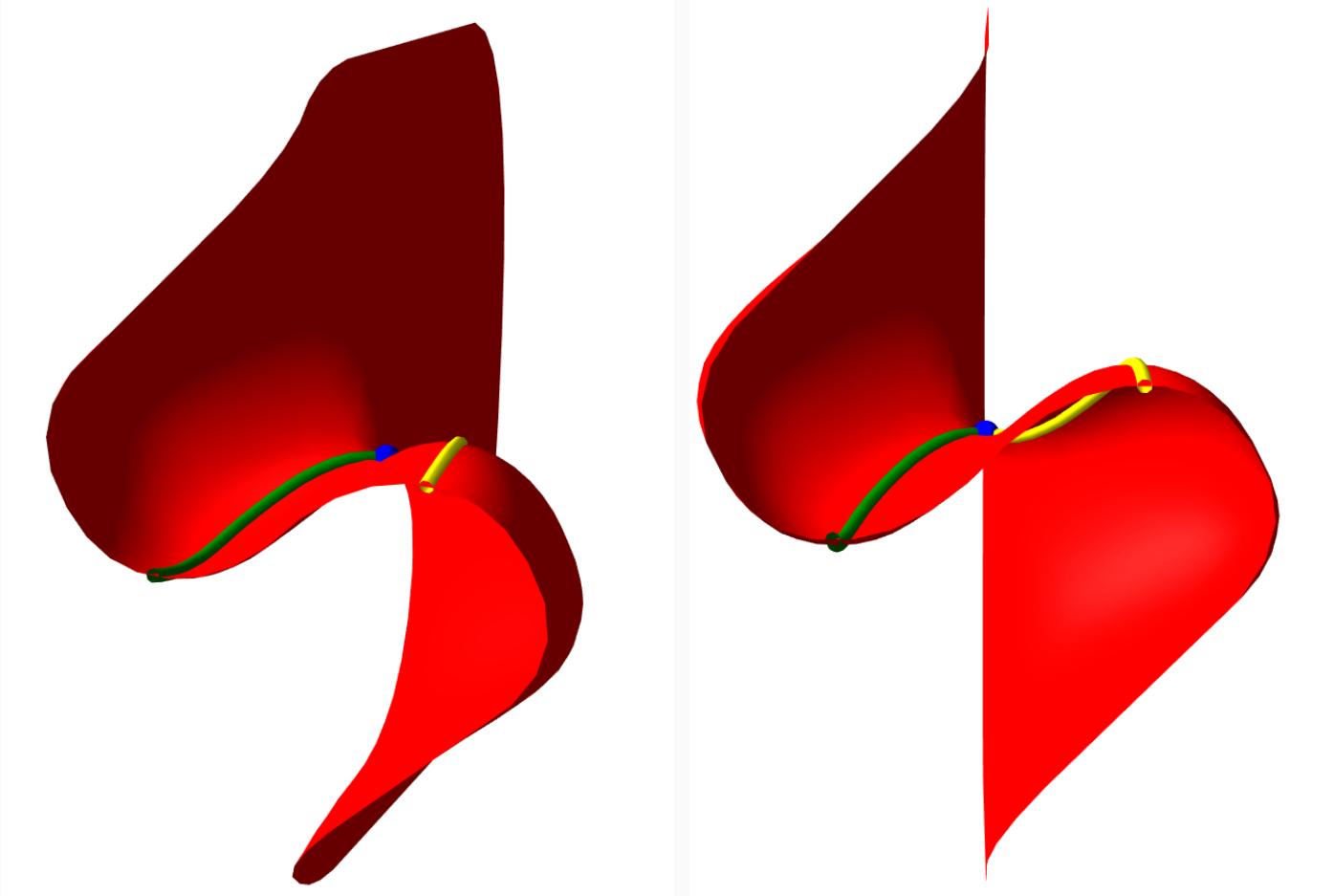


3-diagrams: reassociate

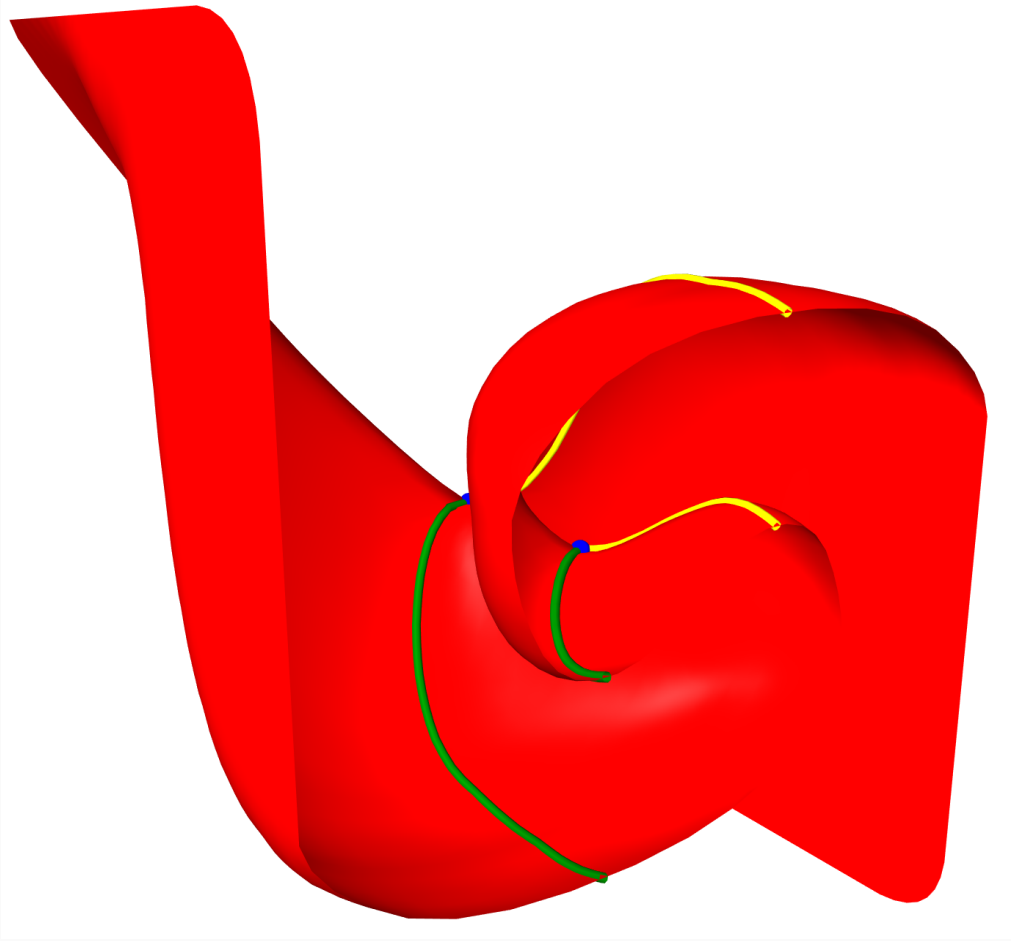




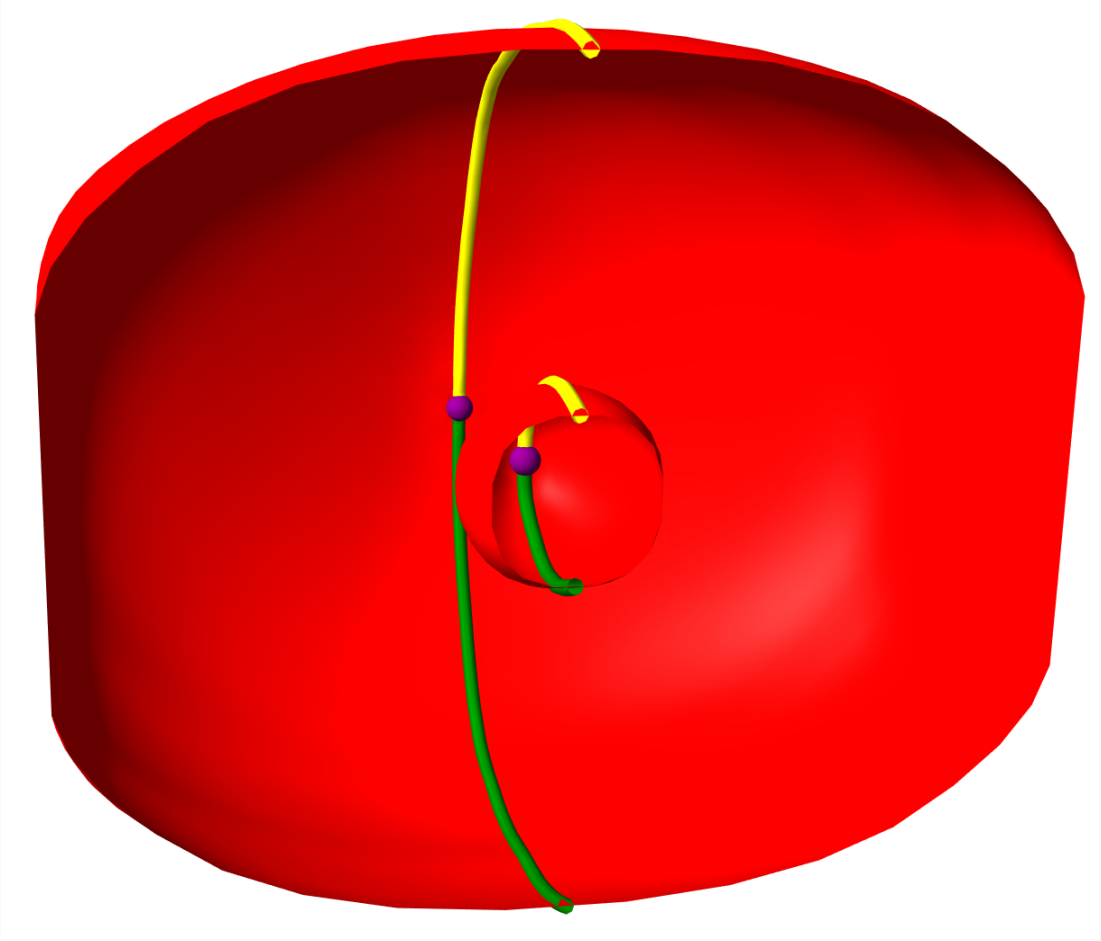
3-diagrams: snake elimination



3-diagrams: double snake elimination

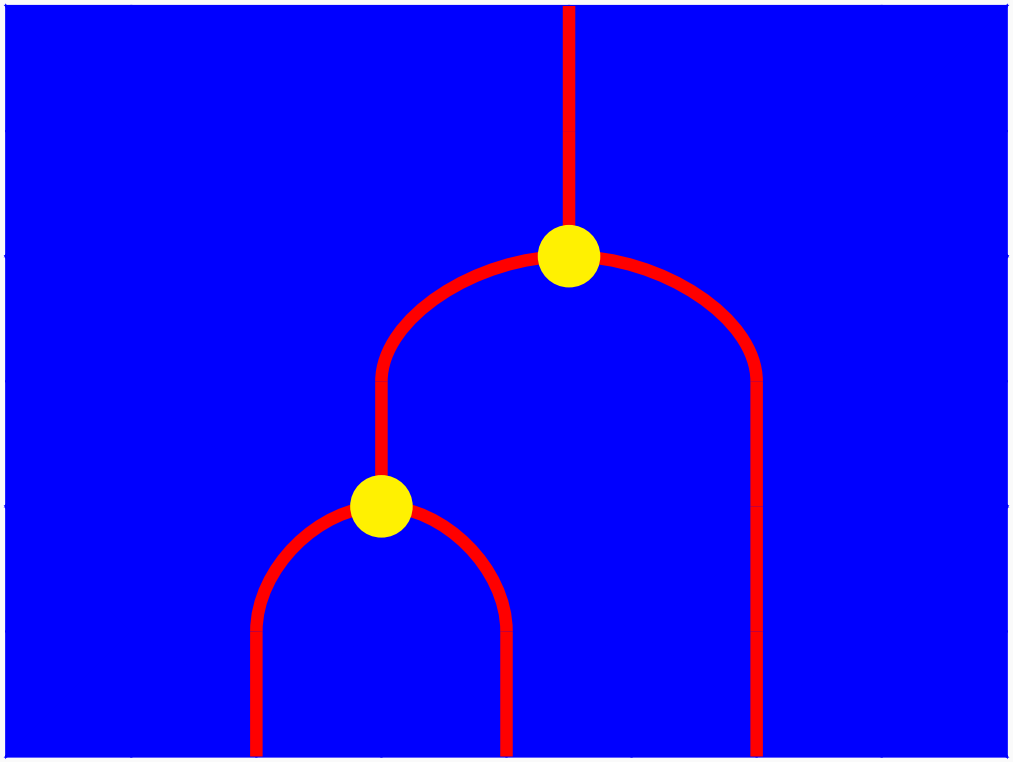


3-diagrams: stacked cups

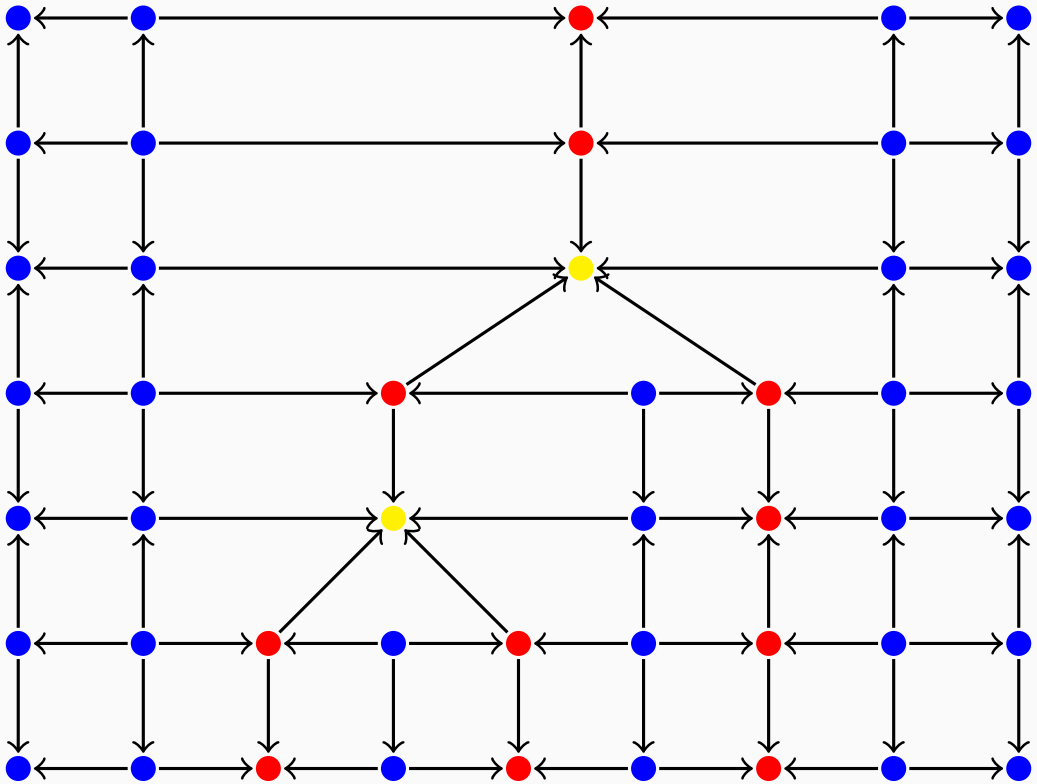


Scaffolds

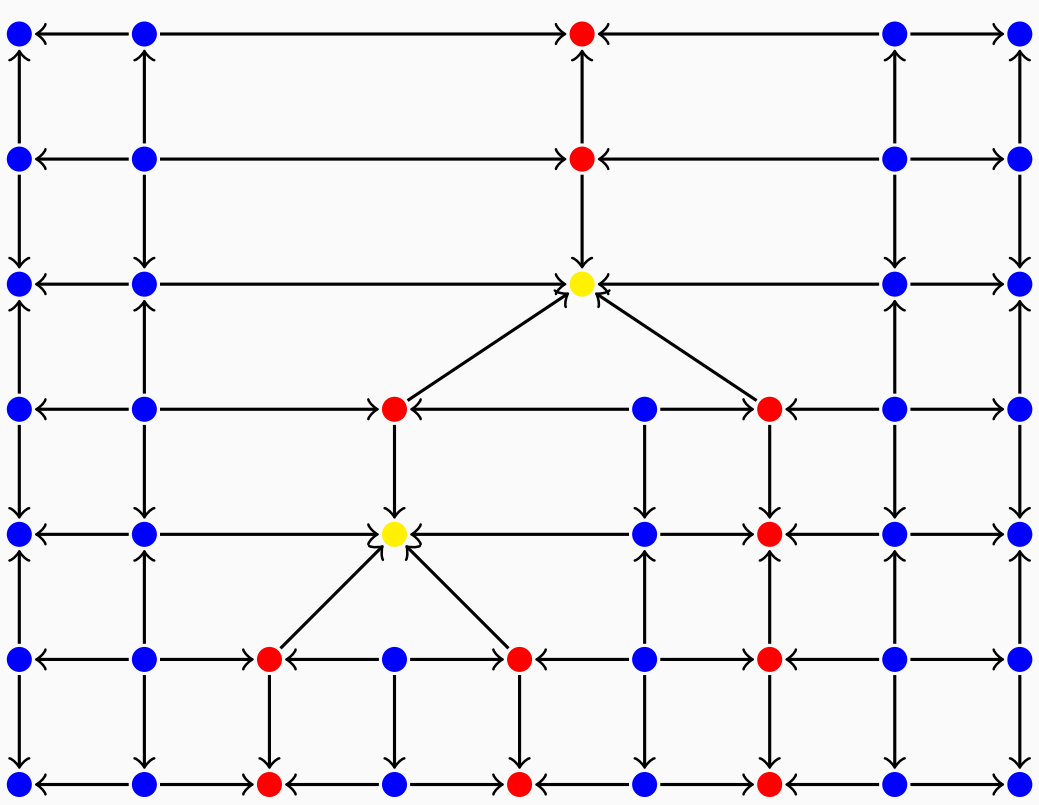
2-diagram



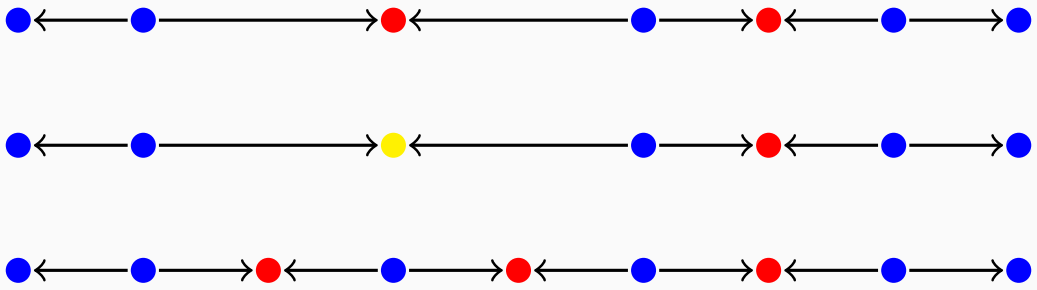
2-scaffold



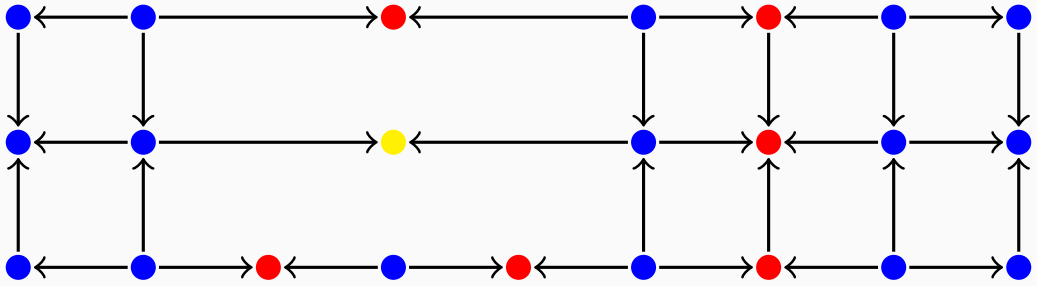
2-scaffold: slices



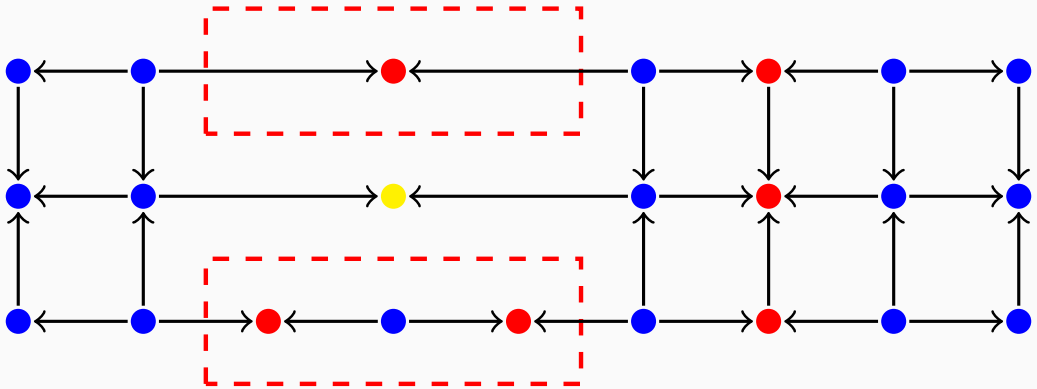
2-scaffold: edges



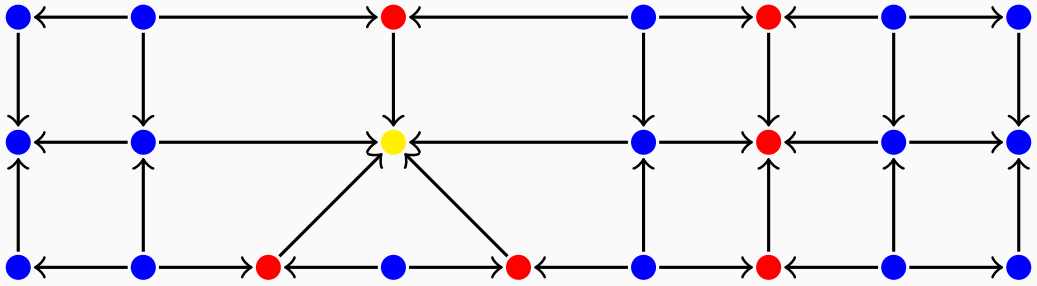
2-scaffold: edges



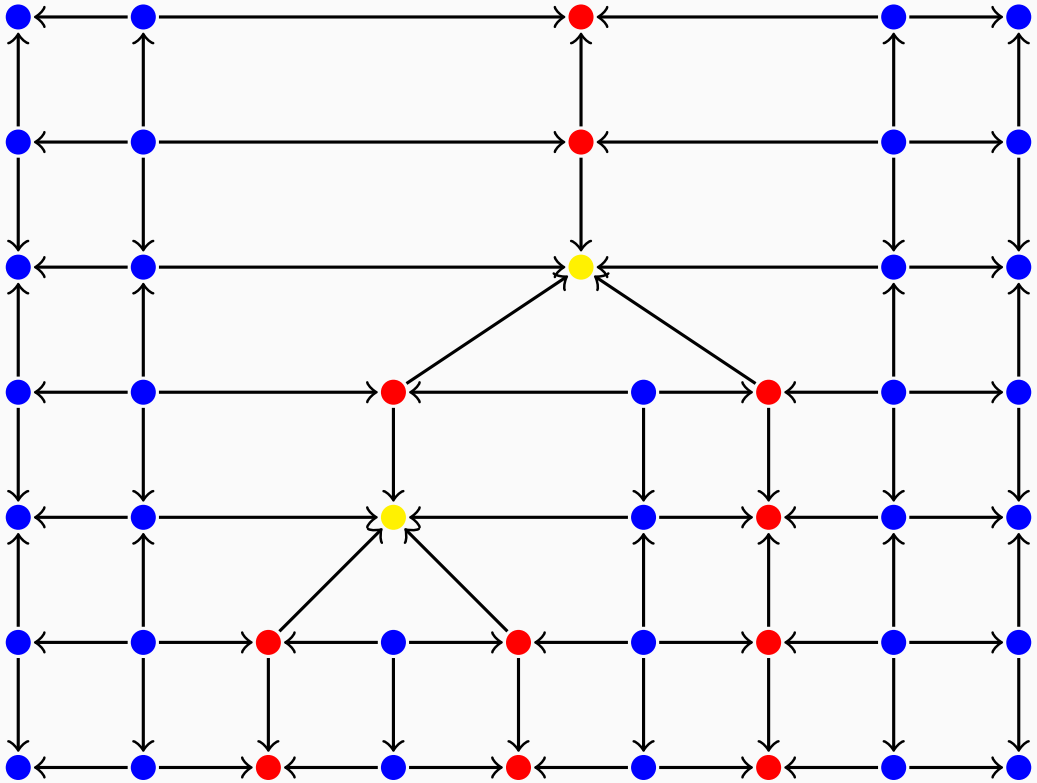
2-scaffold: edges



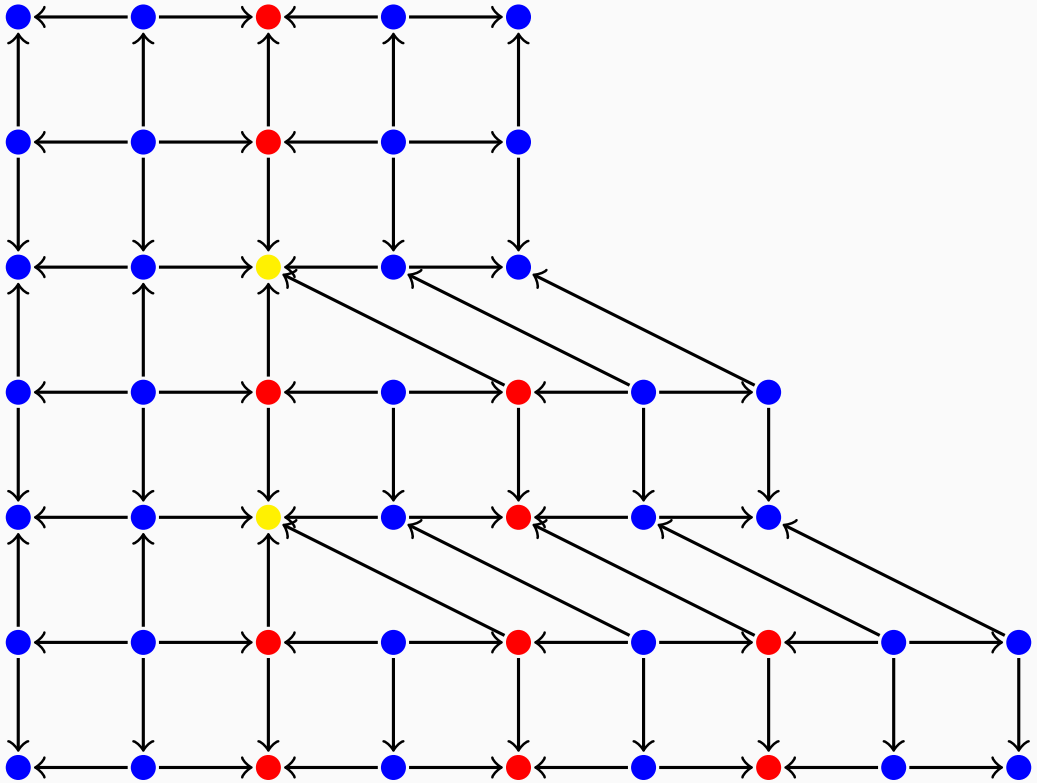
2-scaffold: edges



2-scaffold with layout

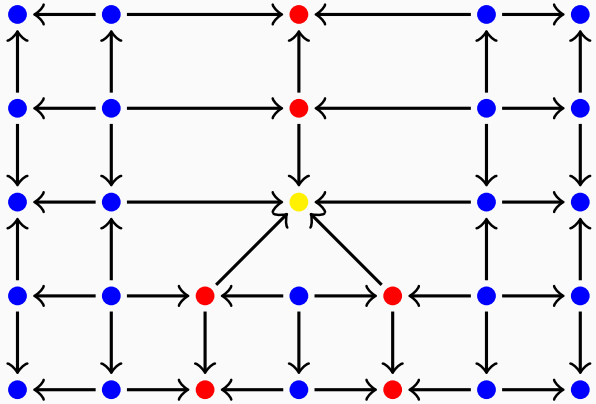


2-scaffold without layout

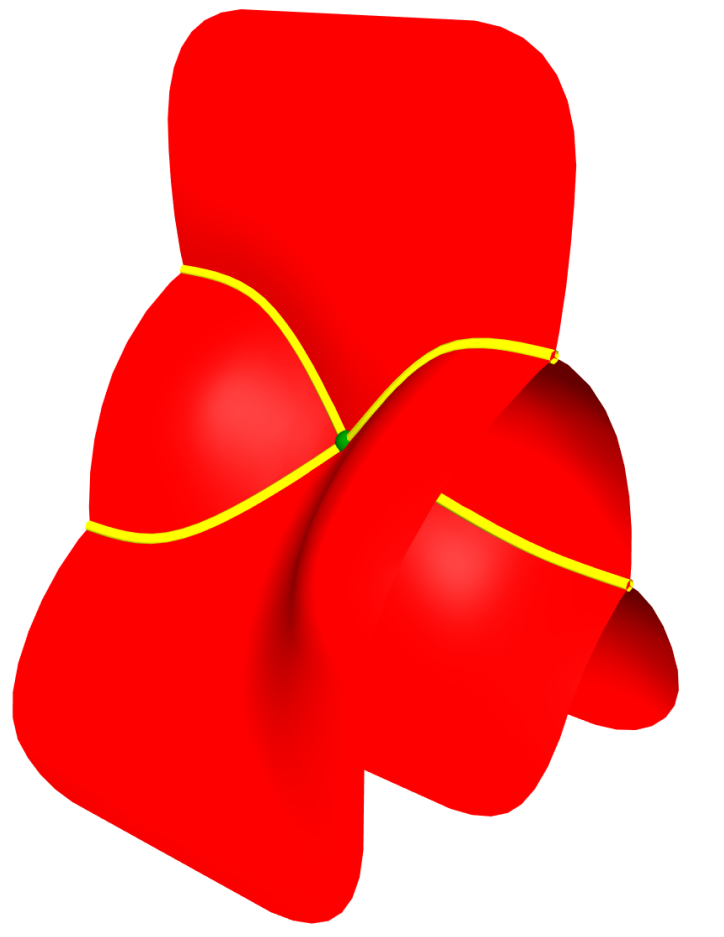


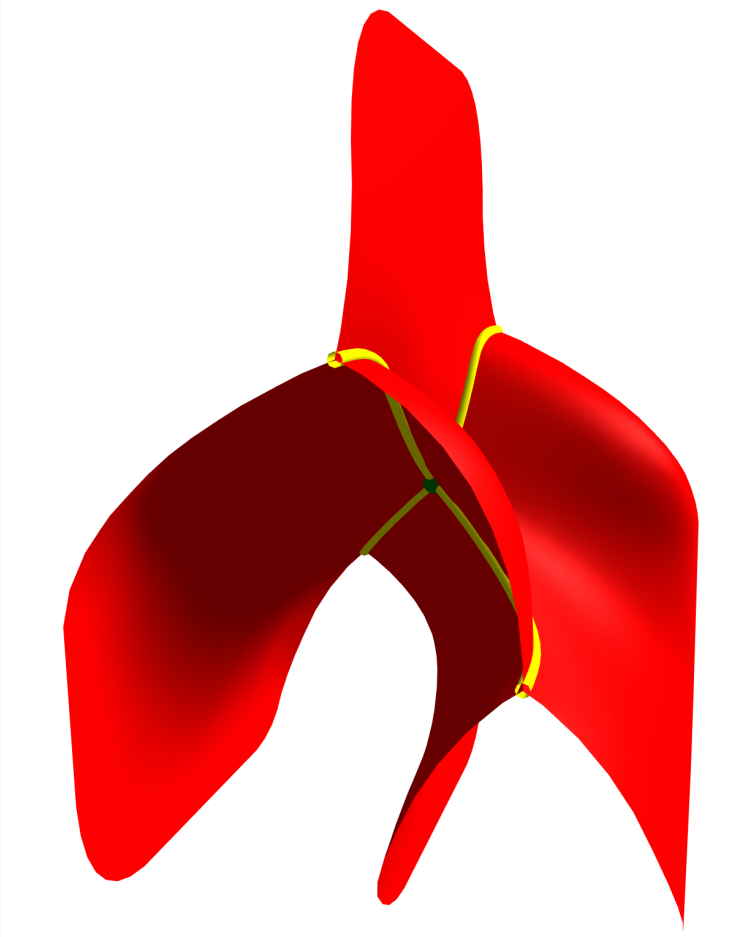
Layout via Linear Program

1. Distance constraints
2. Average constraints
3. Height constraints

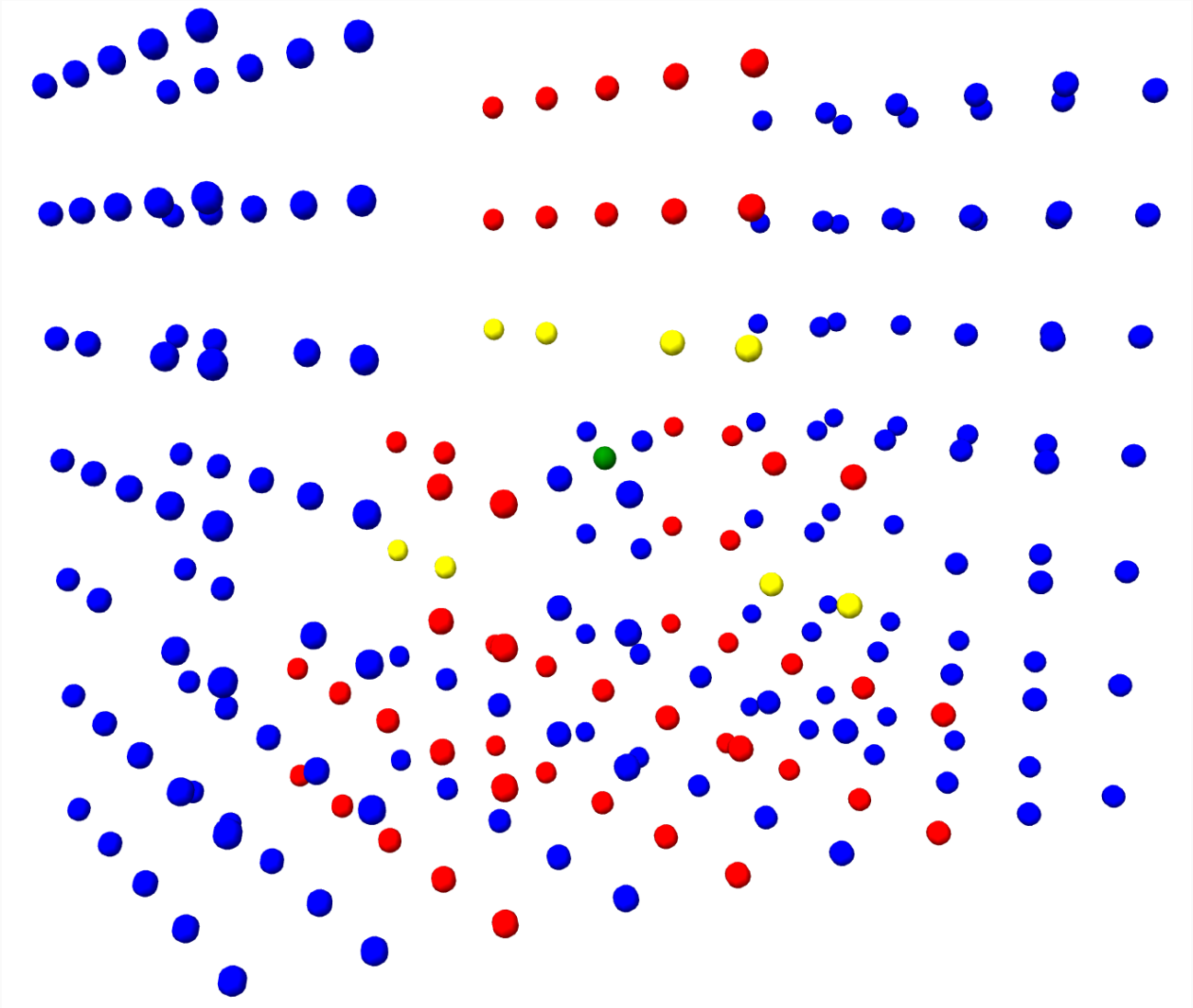


3-diagram

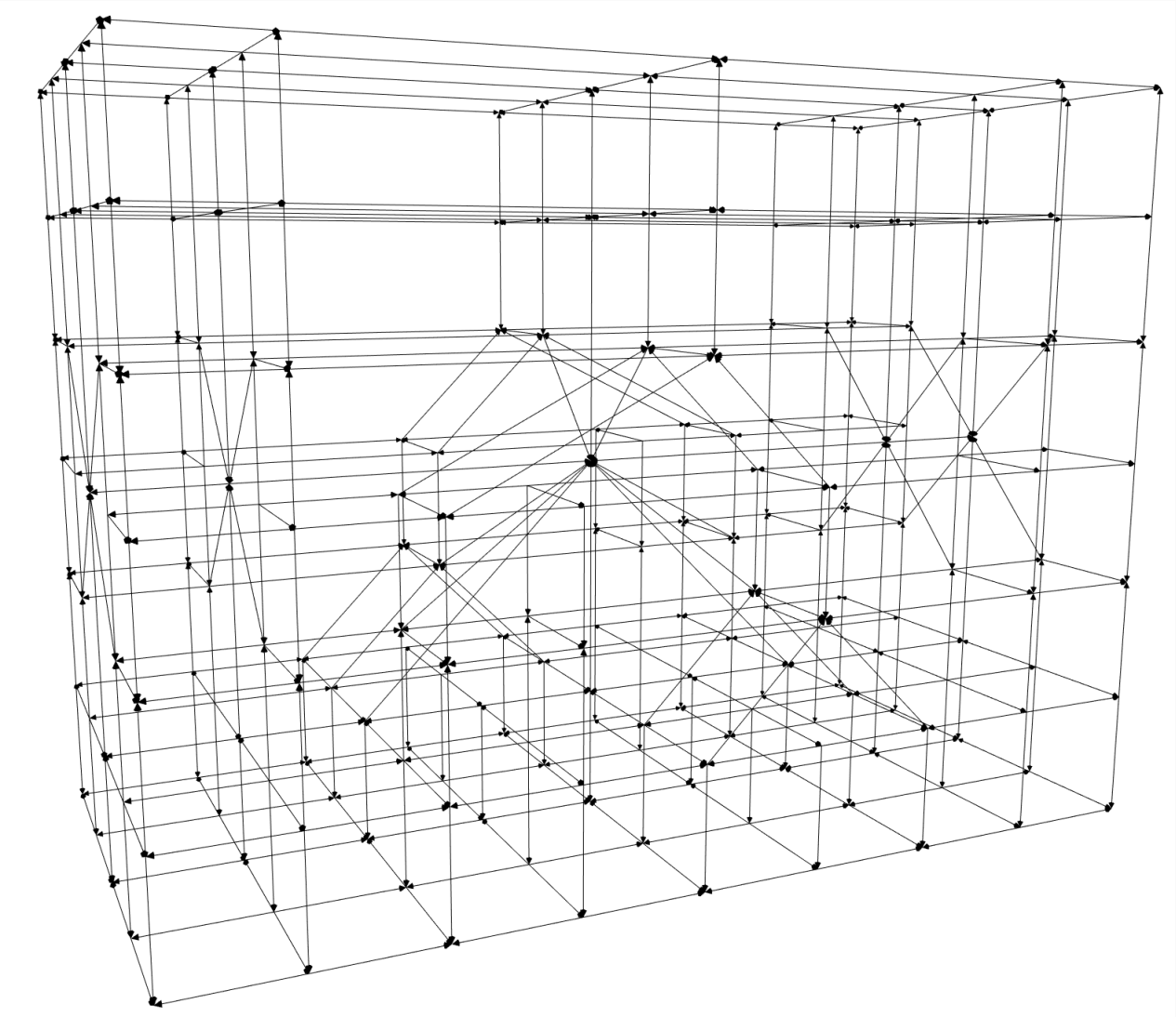




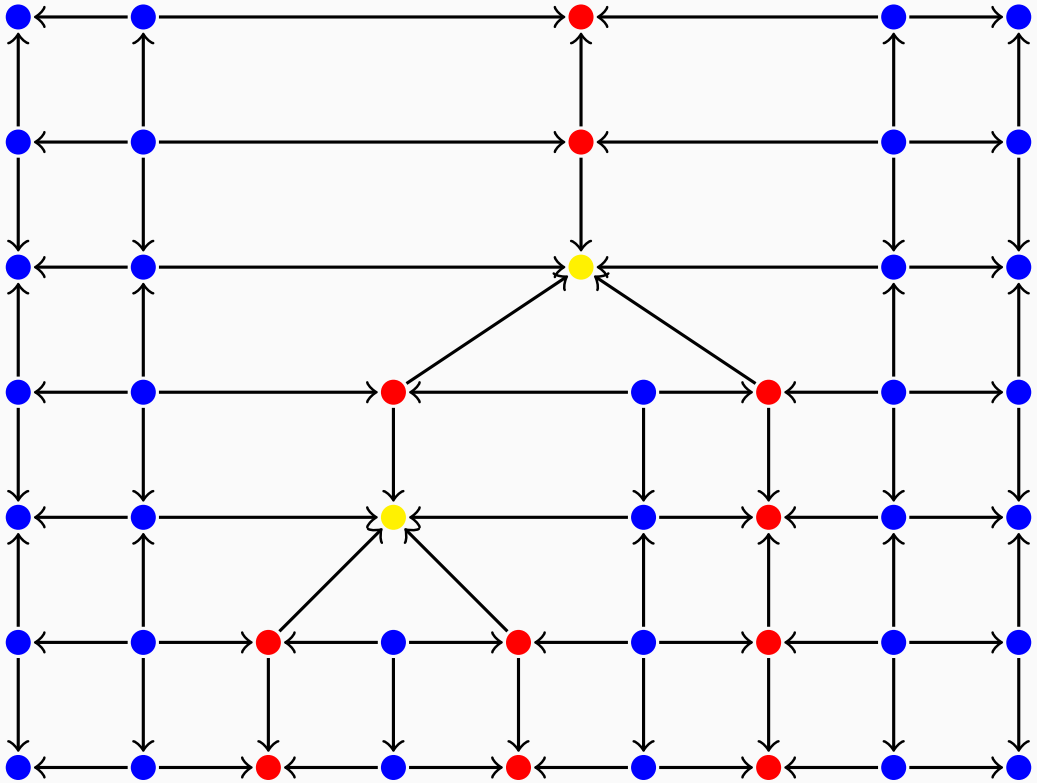
3-scaffold points



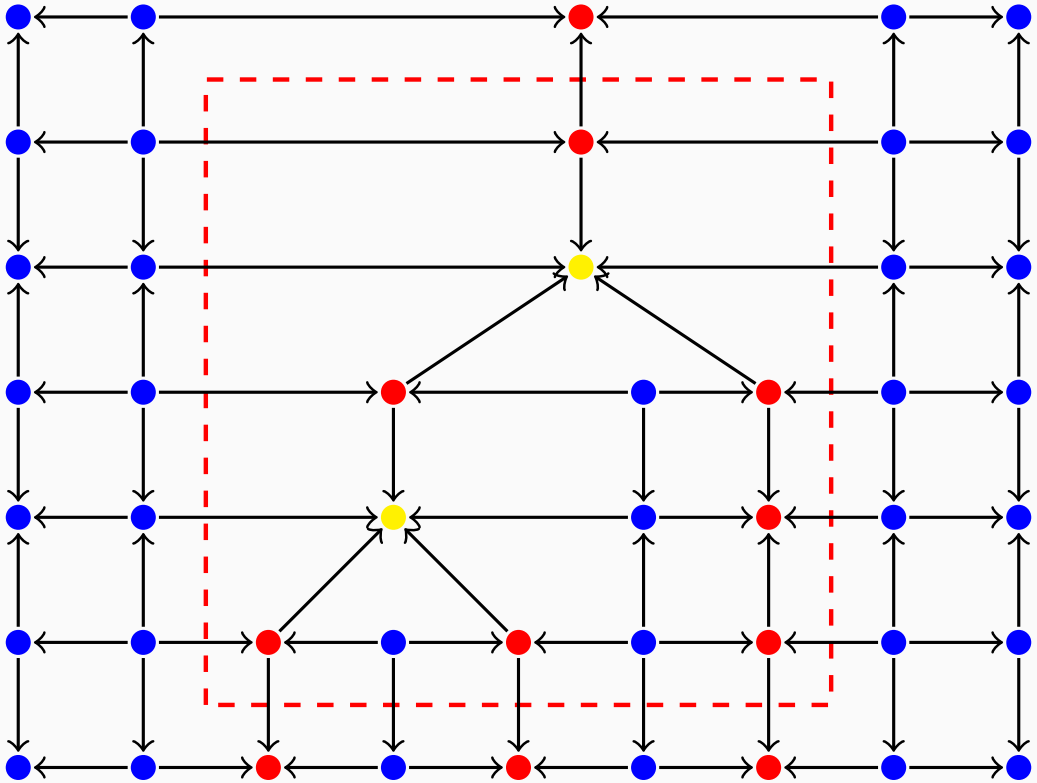
3-scaffold edges



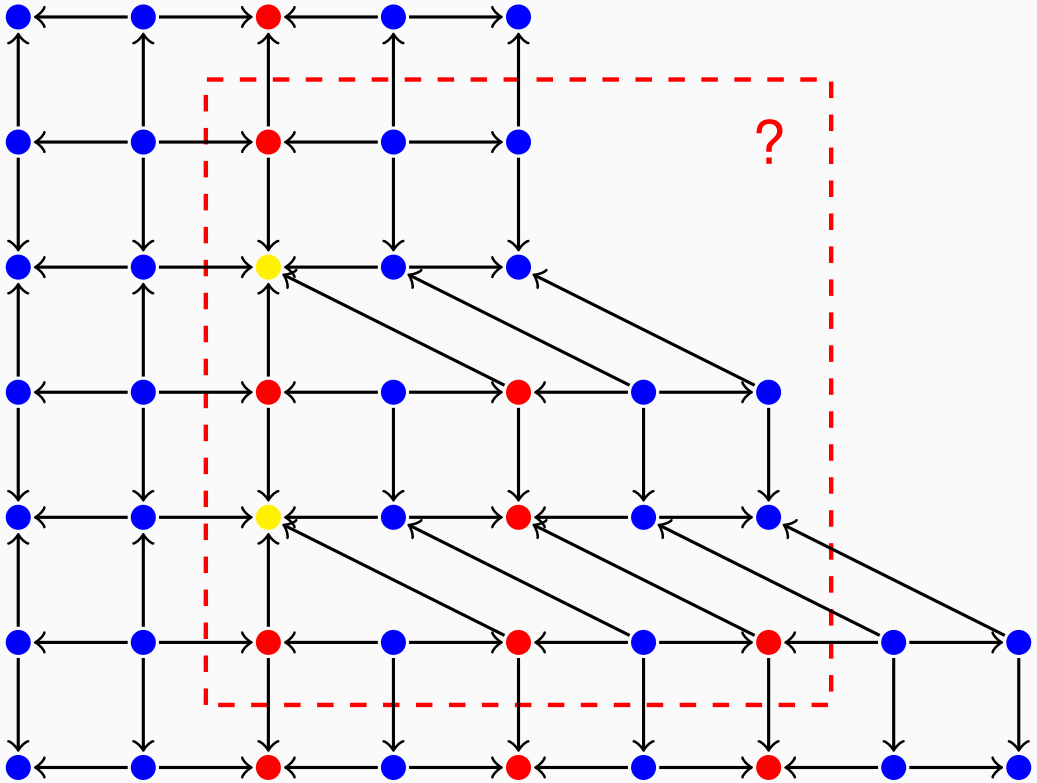
3-scaffold contraction



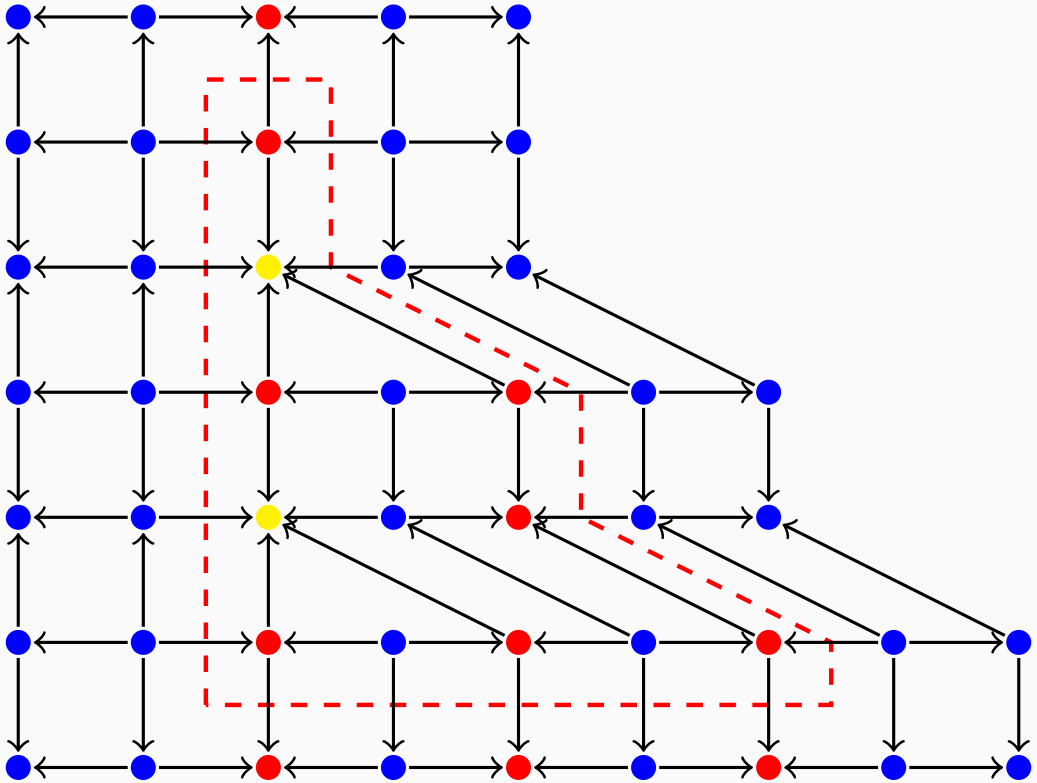
3-scaffold contraction



3-scaffold contraction

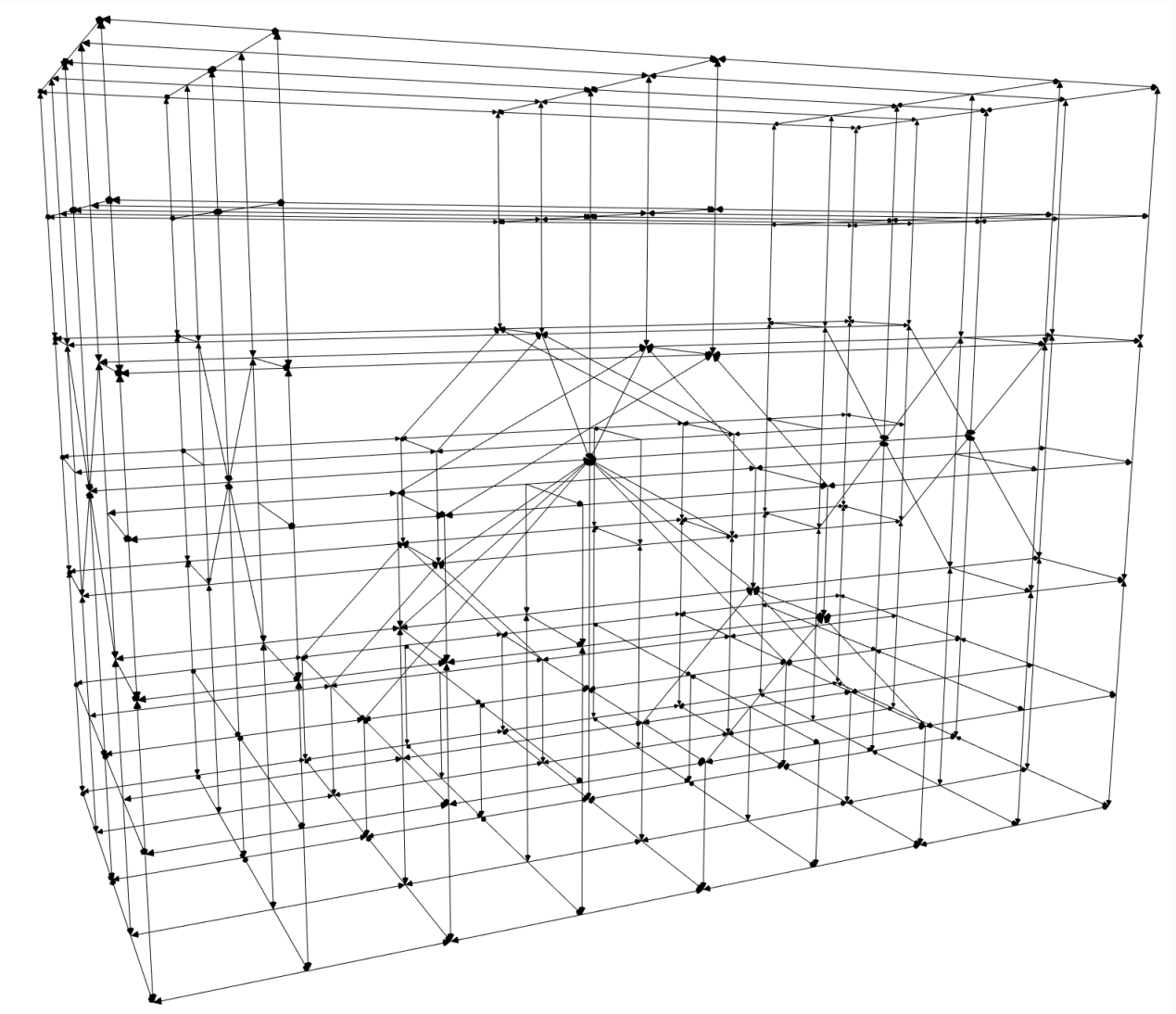


3-scaffold contraction

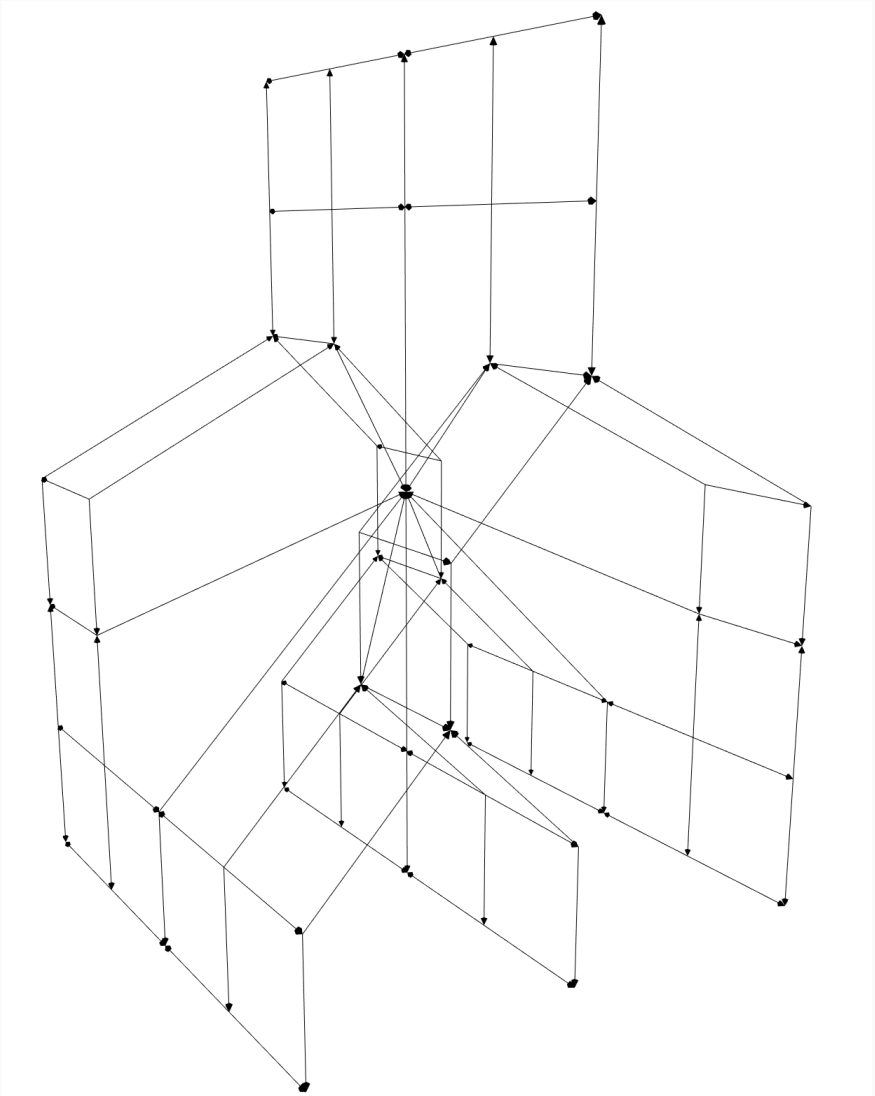


Geometry

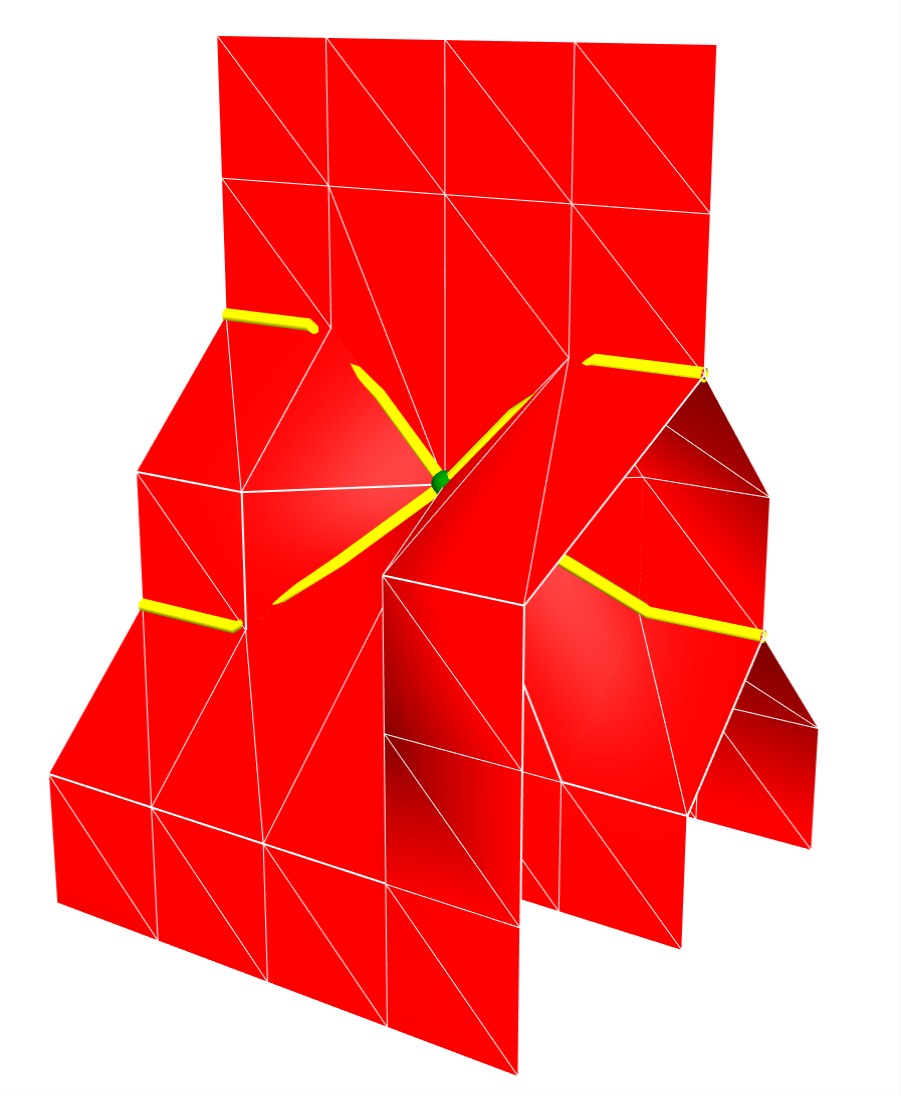
Surface



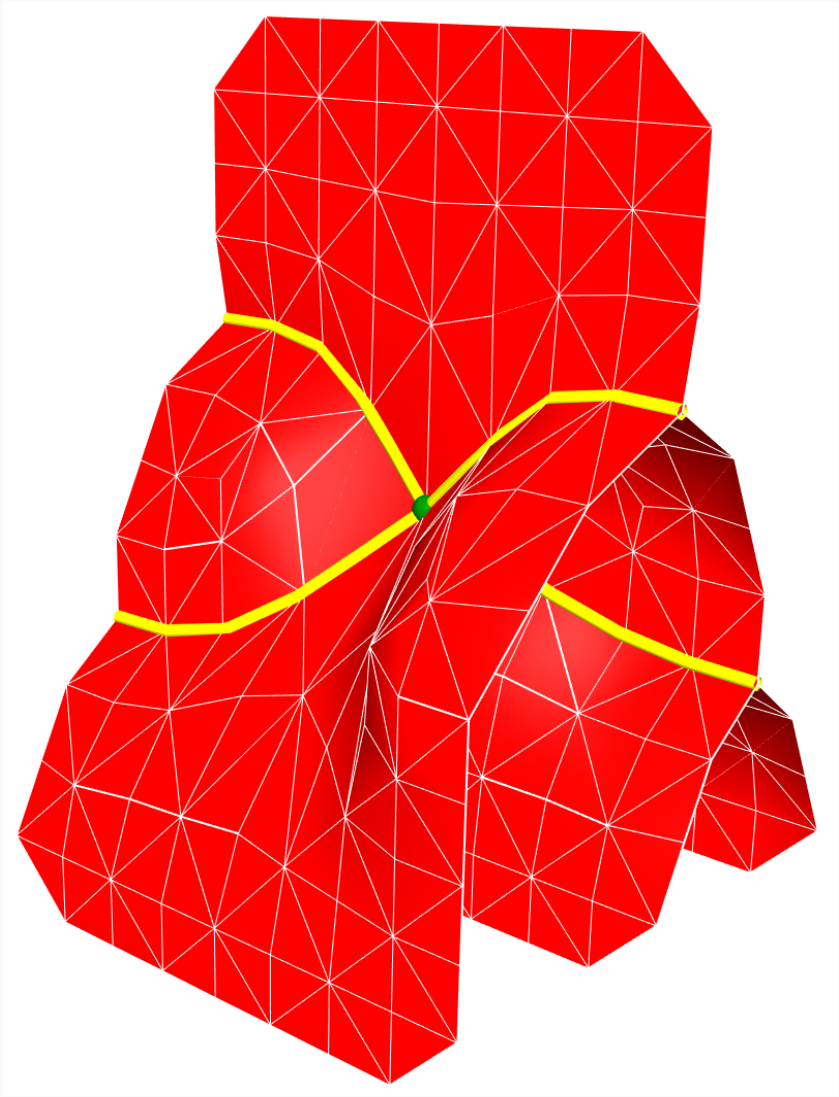
Surface



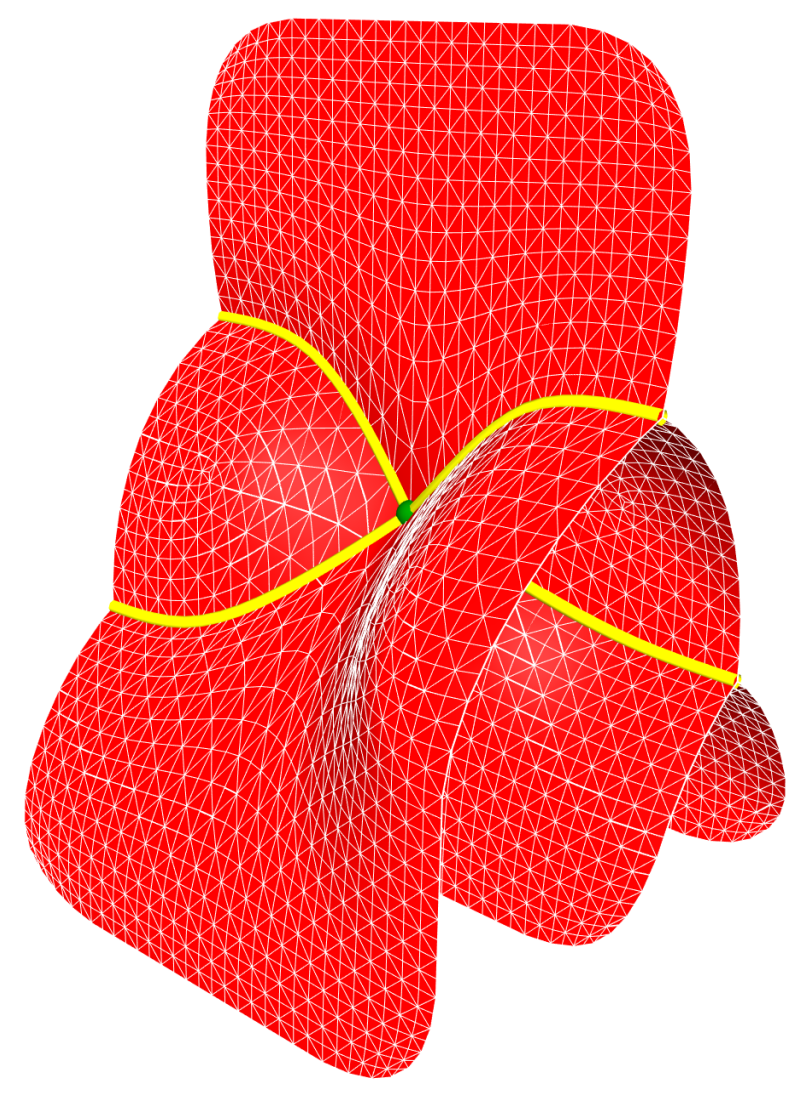
Surface



Surface



Surface



Conclusion

Long way to go

1. Transparency, silhouettes, etc.
2. Exportable illustrations for inclusion in papers.
3. Interactivity.
4. Bugs and performance.
5. Building software that is useful to you.

Thank you!