Planar Configuration Spaces

of Disk Arrangements and Hinged Polygons

Clinton Bowen

Cal State Northridge

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hingeOnThreeDistinctPolygons.pdf

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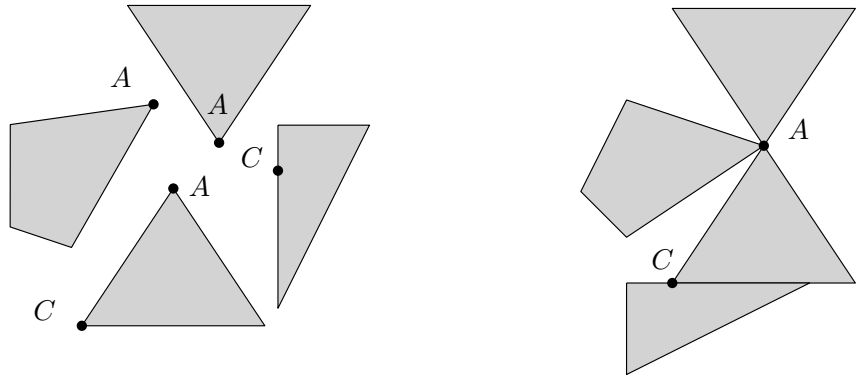

Figure: Caption Text

Hinged Dissections

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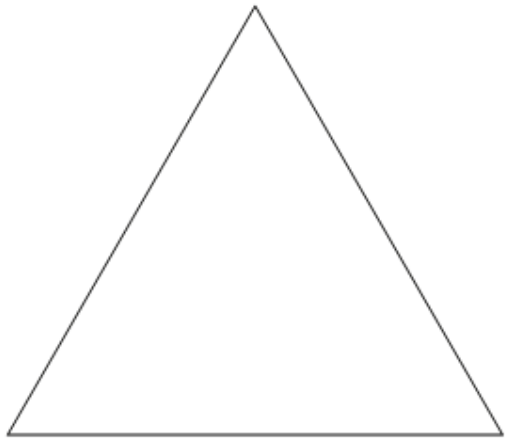

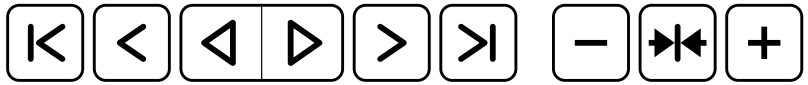

Figure: blah

Protein Folding

Protein folding is the process in which a protein chain acquires its 3-dimensional structure.

* Proteins in an organism fold into a specific geometric pattern (sometimes referred as its *native state*).
* Geometric patterns can determine a protein's function and behavior.

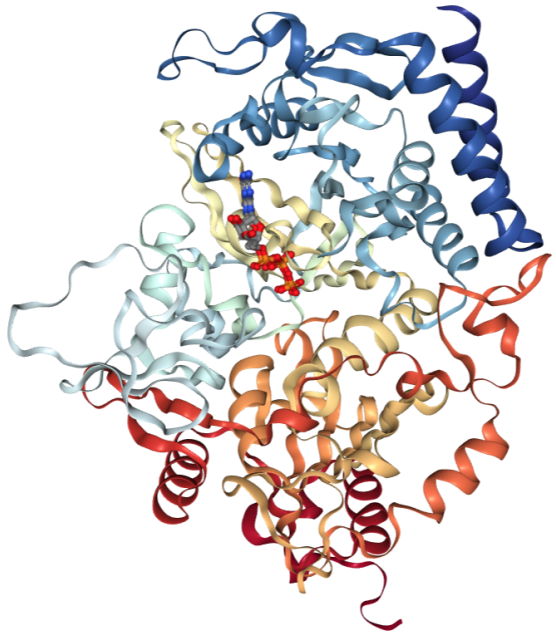

Figure: The structure of rat cytosolic PEPCK variant E89A in complex with oxalic acid and GTP [**?**].

HingedLogicEngineSmallEnumerated.pdf

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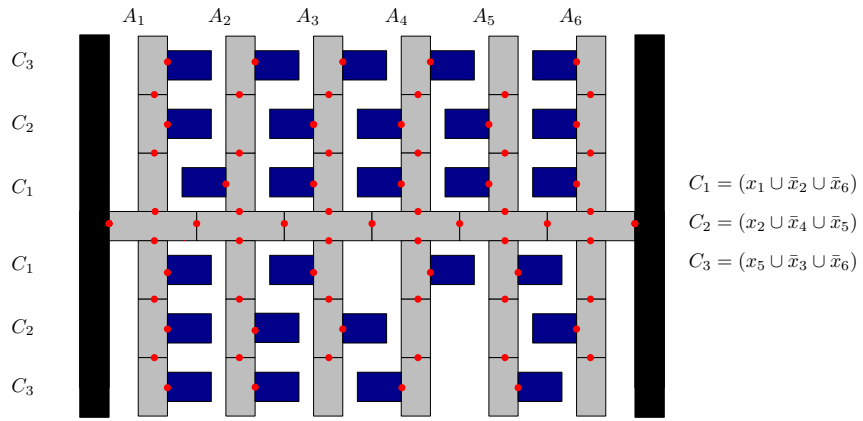

Figure: Caption Text

fig-assoc-hex.pdf

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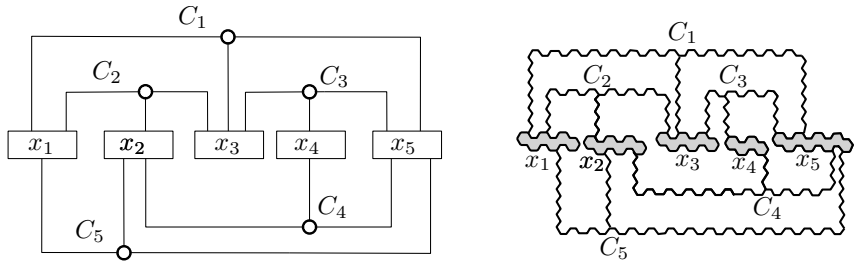

Figure: Caption Text

honeycomb.pdf

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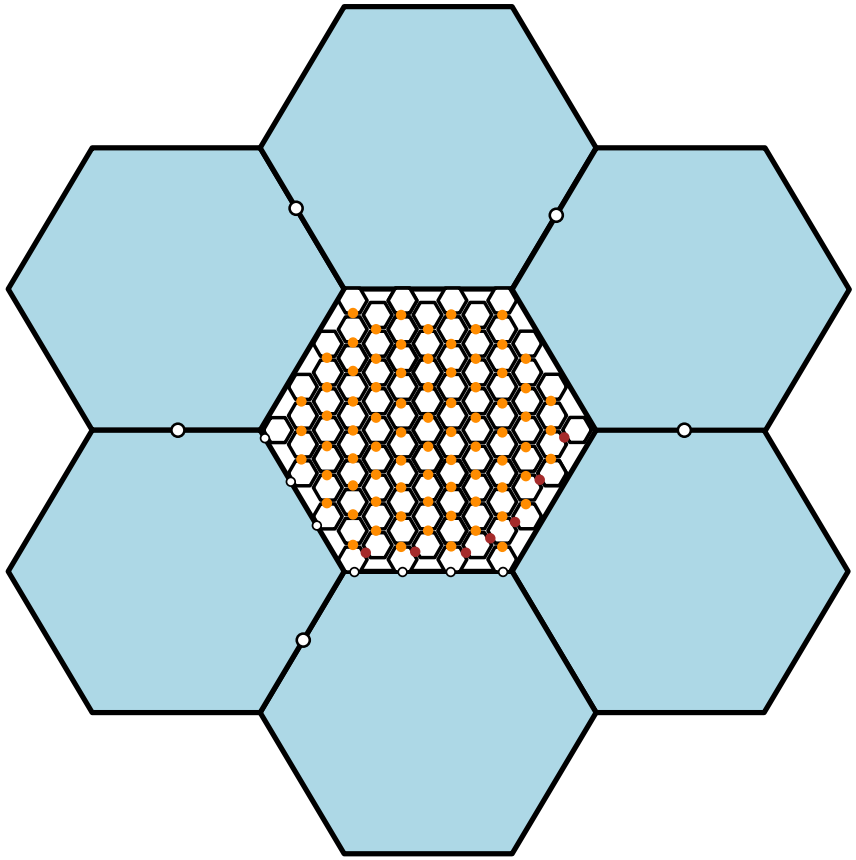

Figure: Caption Text

FalseVariableNonNegatedLiteralTransmitter.pdf

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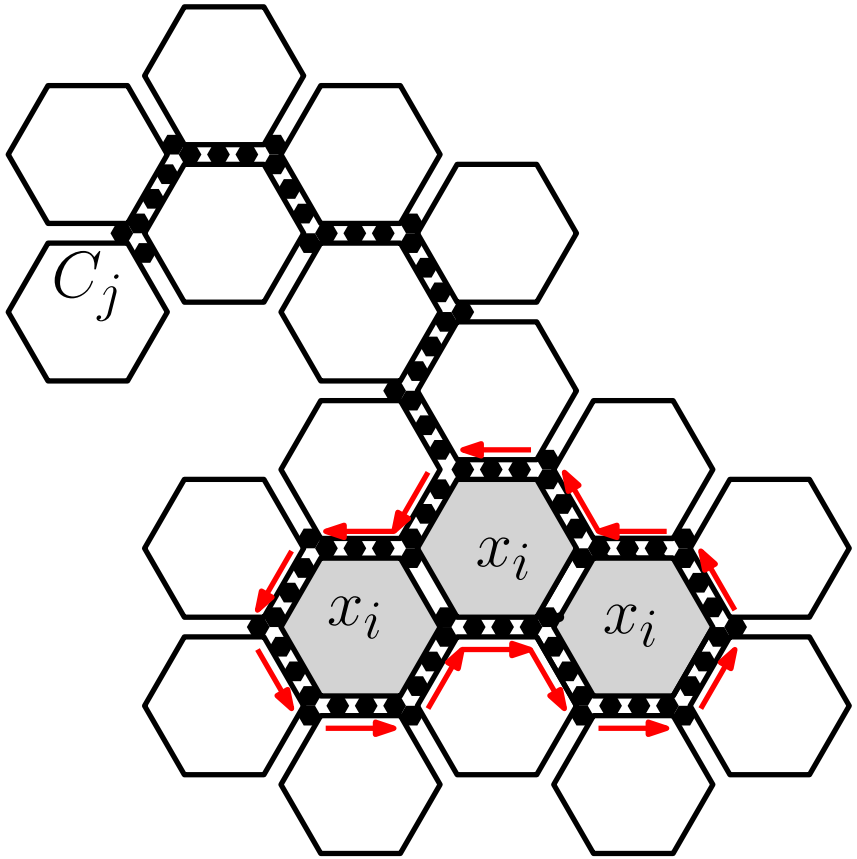

Figure: Caption Text

fig-variable-hex+.pdf

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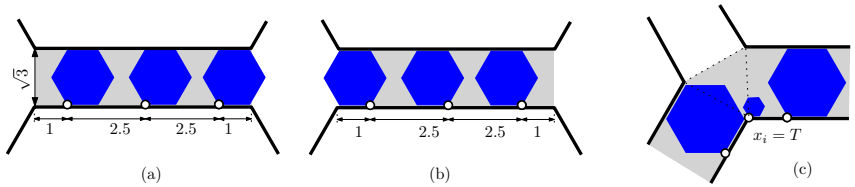

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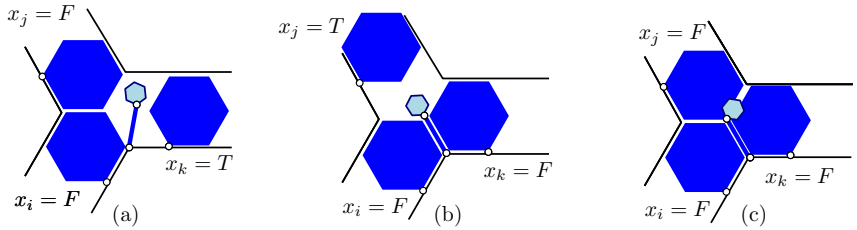

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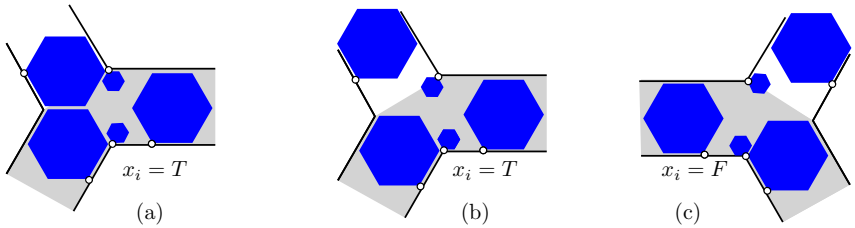

Figure: Caption Text

fig1+.pdf

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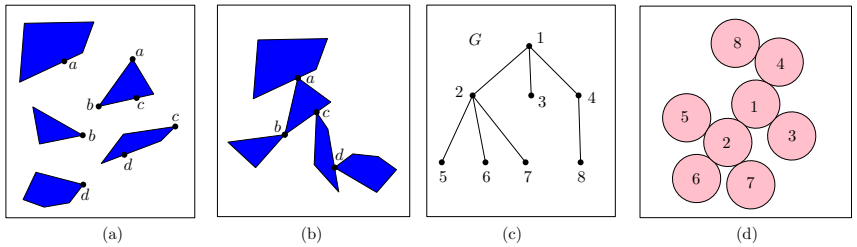

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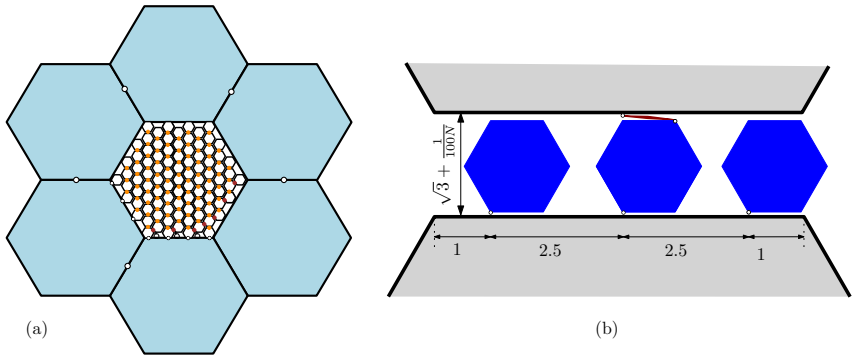

Figure: Caption Text

hexagonPetiolesLeafs9Layers.pdf

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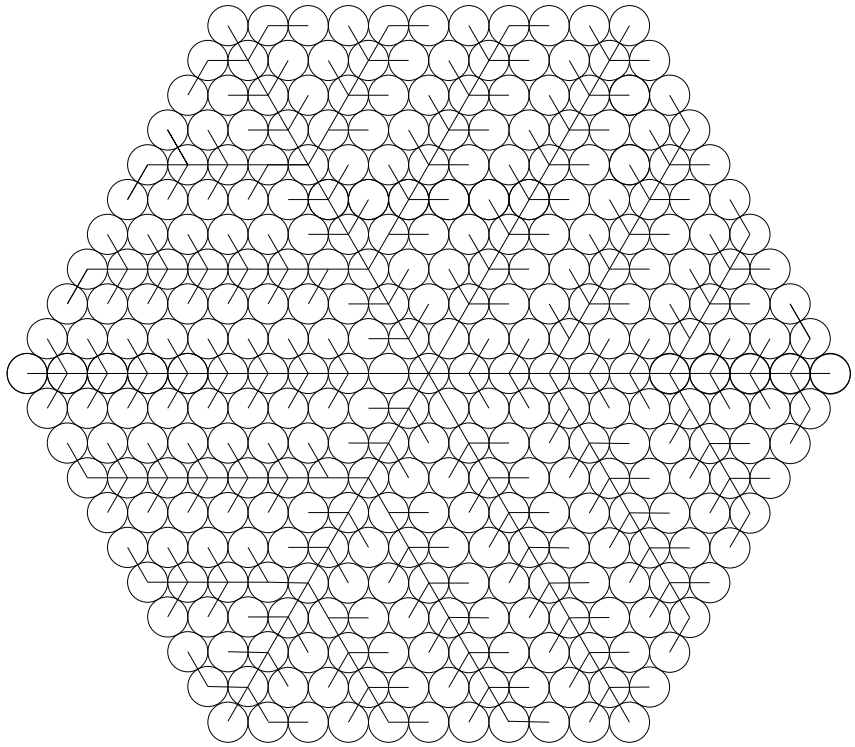

Figure: Caption Text

honeycomb.pdf

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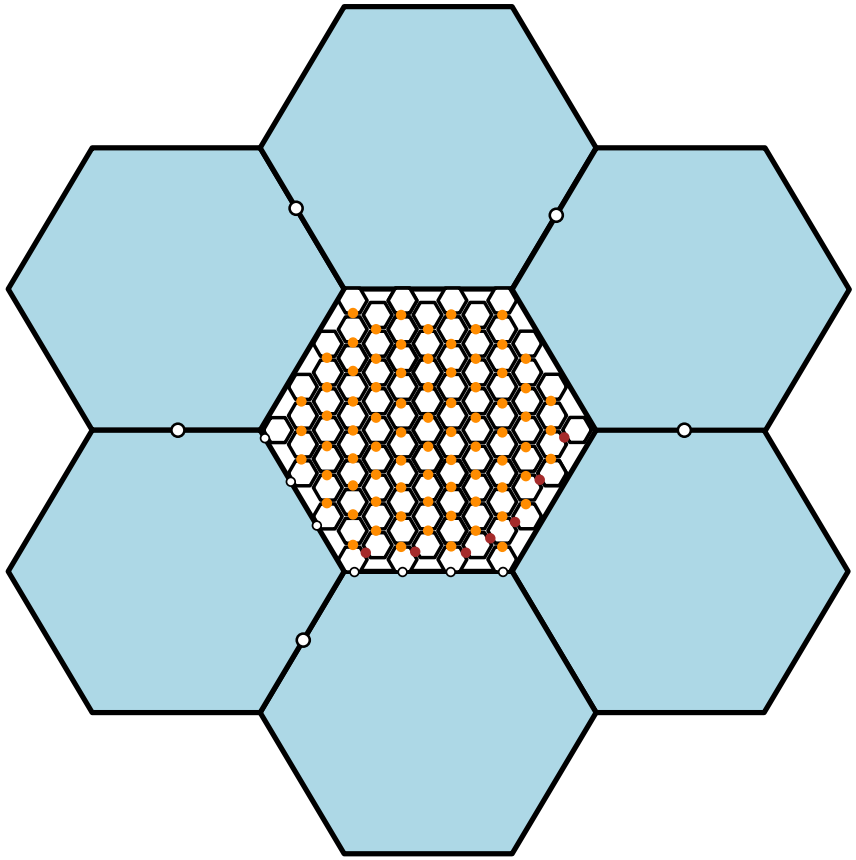

Figure: Caption Text

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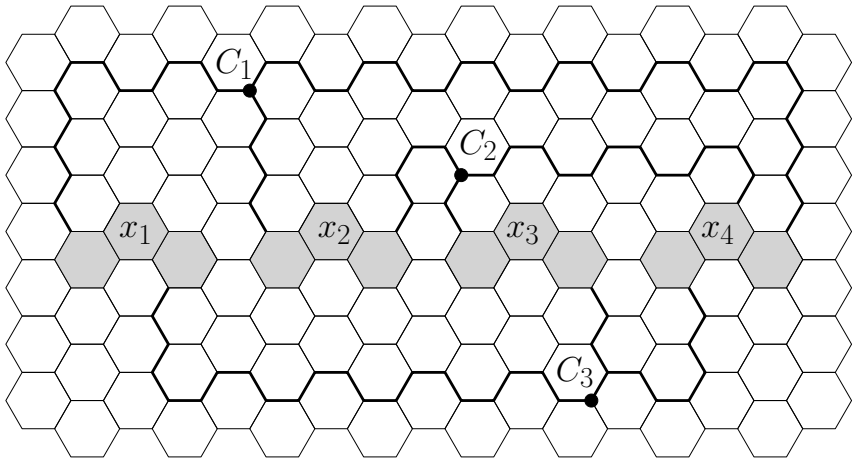

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VariableGadgetSmall.pdf

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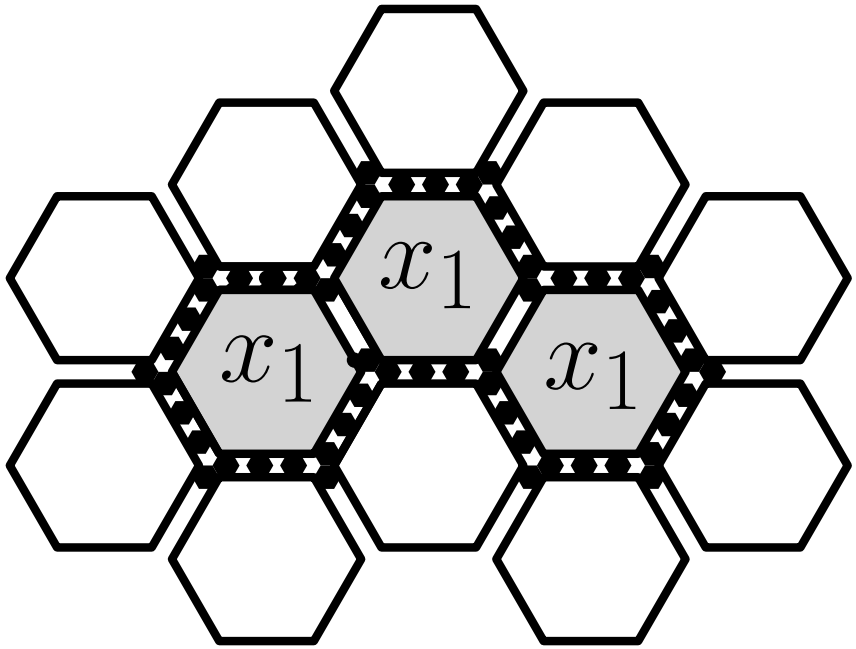

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VariableGadgetTruthness.pdf

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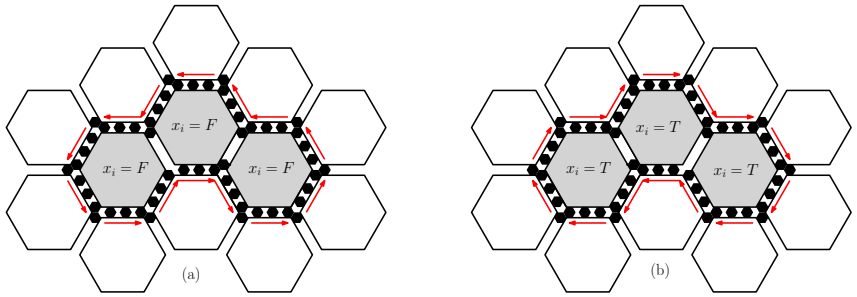

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Problem

Consider three realizability problems when the union of the polygons (resp., disks) in the desired configuration is simply connected (i.e., contractible). That is, the contact graph of the disks is a tree, or the "hinge graph" of the polygonal linkage is a tree (the vertices in the *hinge graph* are the polygons in $\mathcal{P}$, and edges represent a hinge between two polygons). Our main result is that realizability remains NP-hard when restricted to simply connected structures.