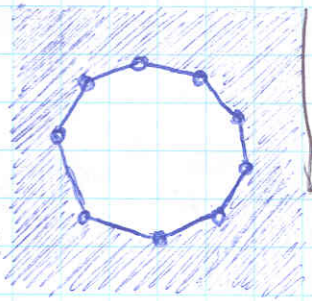
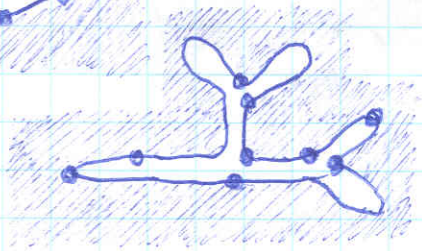
6.885
L13.2
Oct. 27, 2004

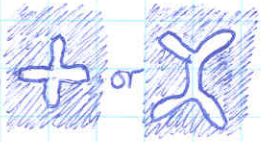
Gluing tree





- turn polygon "inside out"
- gluing of that boundary forms a cycle around a tree
  → gluing tree
- dual to cutting tree in unfolding

Properties:

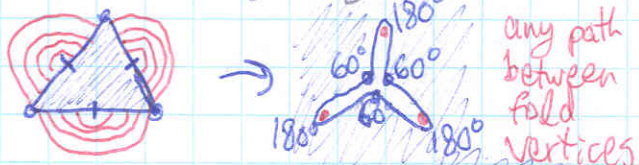
- each leaf is either a vertex ("zipped") or a fold point in the middle of an edge
- at most one nonvertex is glued at junction of degree ≥ 3.
  (else $180° + 180° + \text{something} > 360°$)
- at most four fold points
  (each one creates $180° = \pi$ curvature; @ 4π total)
- if four fold points, those are the only leaves
  (leaves always induce curvature) ⇒  or

Rolling belt = path in gluing tree

whose end points are fold [redacted] points or convex vertex leaves

& along which always ≤ 180° material on either side

- effectively an embedded convex polygon
  ⇒ can perimeter halve arbitrarily ↔ "rolling" the belt
- the only way to get continuum of glueings
- three+ multiple overlapping belts: [redacted] (>3??)



- two disjoint belts: bicontinuum

- O(1) belts because ≤ 4 fold points & convex-vertex leaves

OPEN: characterize polygons with rolling-belt gluing trees