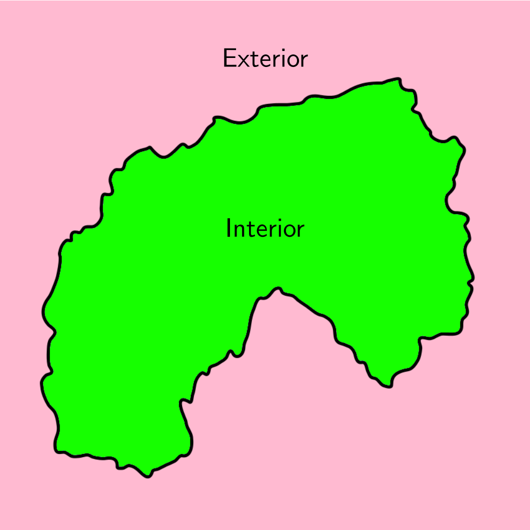
What is...the Jordan curve theorem?

Or: Come on, that's trivial...

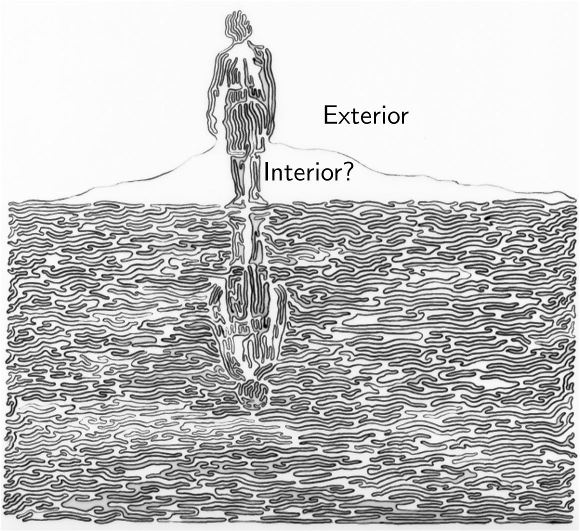
The Jordan curve theorem



Any non-self-intersecting continuous loop in $\mathbb{R}^2$ divides $\mathbb{R}^2$ in interior and exterior

That is trivially true, so we are done

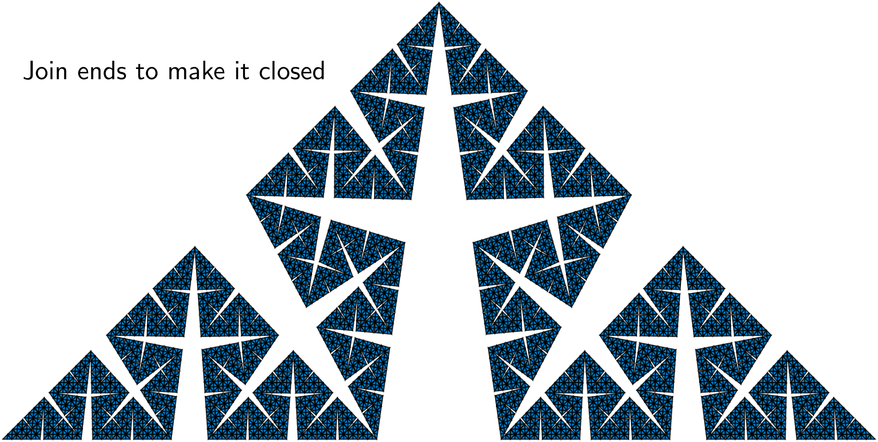
Everyone knows what a curve is...



...or not?

Maybe this is not trivial...there are many "curves"!

A curve with positive area!?



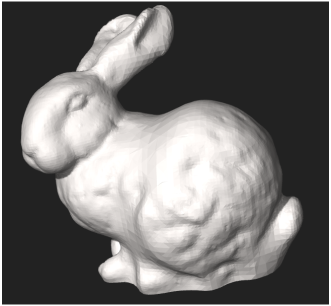
- The curve above divides $\mathbb{R}^2$ into interior and exterior and has positive area
- The quest for a proof triggered the first steps towards fractal geometry
- “Most” curves are crazy

Enter, the theorem

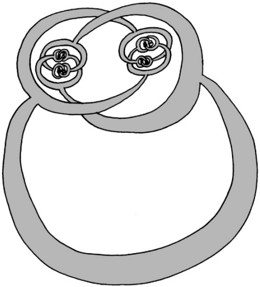
The statement is true and generalizes:

- Any compact connected n-manifold X in $\mathbb{R}^{n+1}$ divides $\mathbb{R}^{n+1}$ in interior and exterior
- For $n = 2$ both regions are $\cong$ to interior and exterior of a standard circle

Both are true :

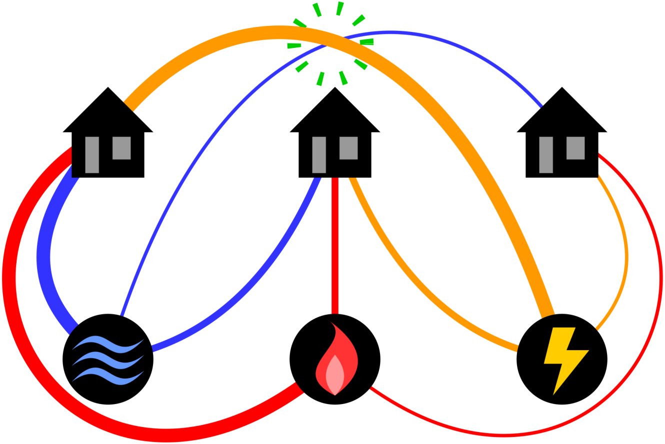


Only the first is true :



- If X is a locally flat n-sphere, then both regions are $\cong$ to interior and exterior of S^n

A part of graph theory?



- Classical Jordan curve theorem $\Rightarrow$ $K_{3,3}$ is not planar
- Surprising Jordan curve theorem $\Leftarrow$ $K_{3,3}$ is not planar
- Mind blowing (imho) Jordan curve theorem $\Leftrightarrow$ $K_{3,3}$ is not planar

Thank you for your attention!

I hope that was of some help.