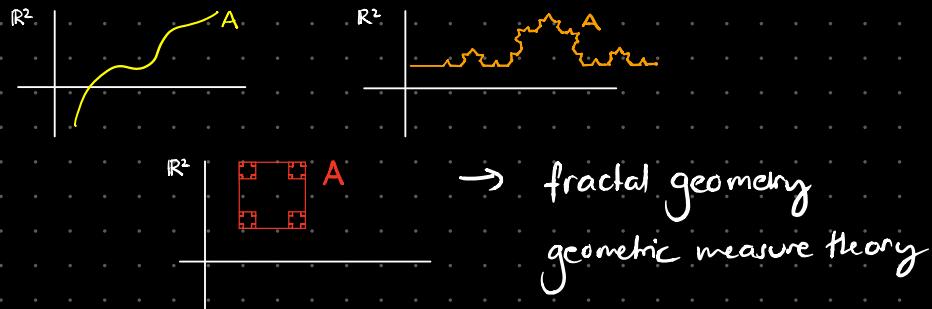


Reminder:

- Measure and Integration Theory 1:
Lebesgue outer measure
Lebesgue measurable sets/functions
Lebesgue integrals

Open questions after the first part:

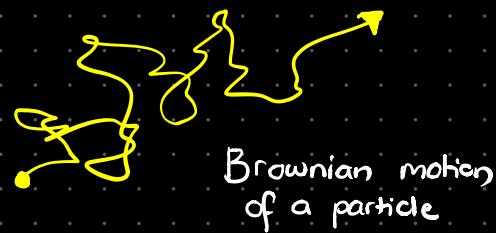
- How to measure the 'size' of 'lower dimensional' subsets of \mathbb{R}^n ?
- $A \subset \mathbb{R}^n$ with $m_n^*(A) = 0$ (sets of zero Lebesgue outer measure)



- How to measure the complexity of irregular sets that arise in nature?



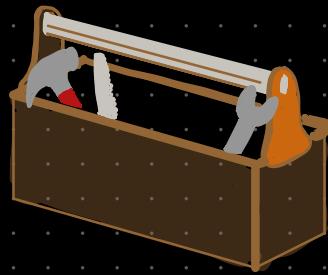
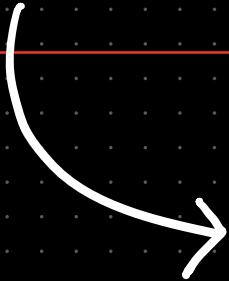
Coast line of Finland
[Picture: Wikipedia]



Brownian motion
of a particle

- How to measure the size of sets that are not subsets of Euclidean space \mathbb{R}^n ?
e.g. probabilities of events

- Measure and Integration Theory 2 : abstract Outer measures
measurable sets / functions
integrals



tool box for

- analysis
- geometry
- probability theory

...

Similar abstraction happened in other areas of mathematics

- Lebesgue measure & integration theory \rightsquigarrow abstract measure & integration theory
- $(\mathbb{R}^n, \|\cdot\|)$ \rightsquigarrow normed spaces
[functional analysis]
- analysis on Euclidean spaces \rightsquigarrow analysis on metric Spaces

etc.