

a curious picture

Prof. Bernt Wahl

Fractals - the geometry of nature

Fractals: The Geometry of Nature



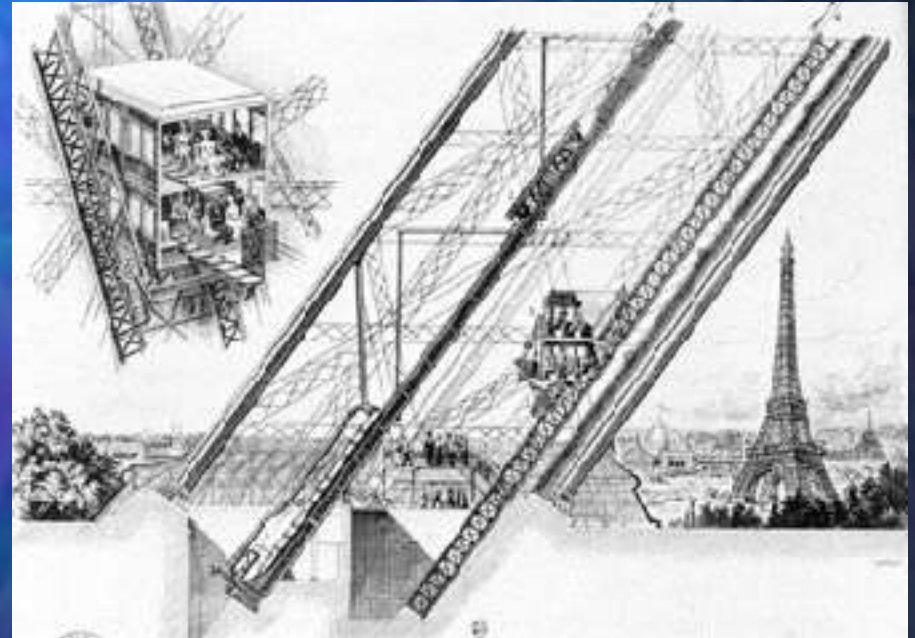
“ Mountains are not cones, clouds are not spheres and bark is not smooth nor does lightning travel in a straight line.”

Benoit Mandelbrot

Gallery of Monsters

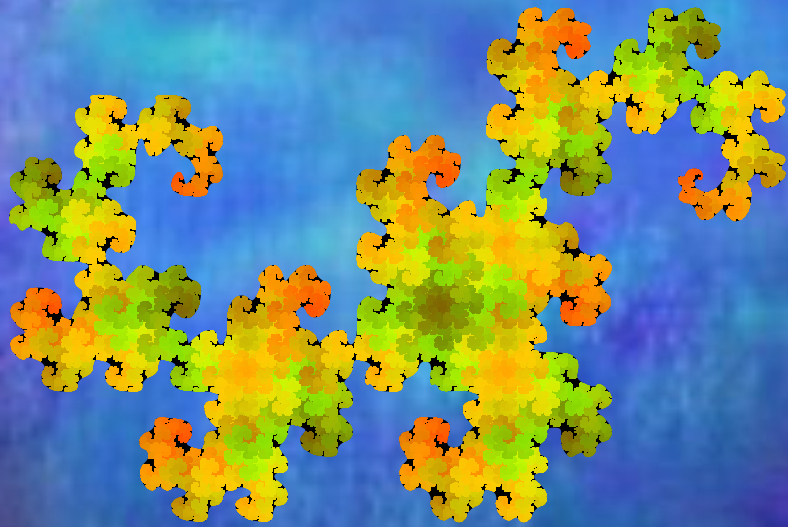


Art

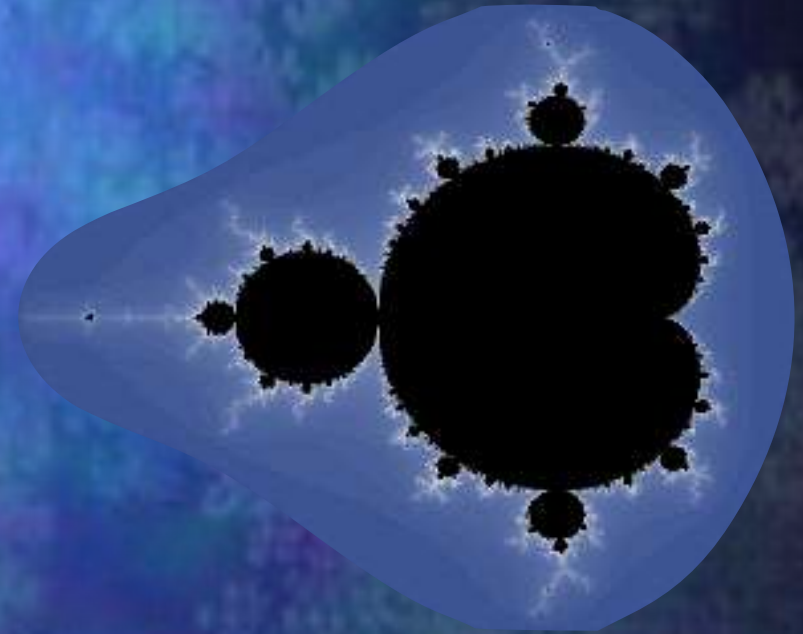


Architecture

Fractal Classes

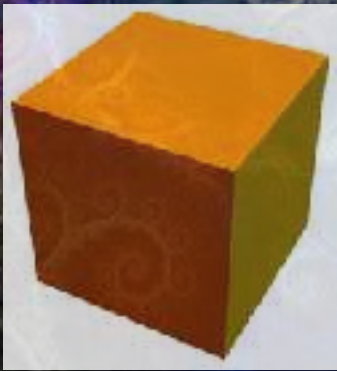
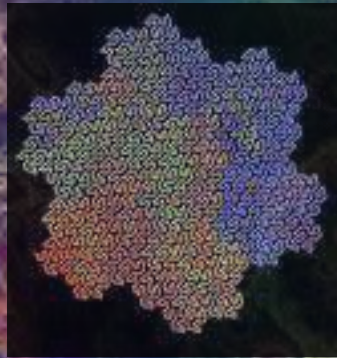
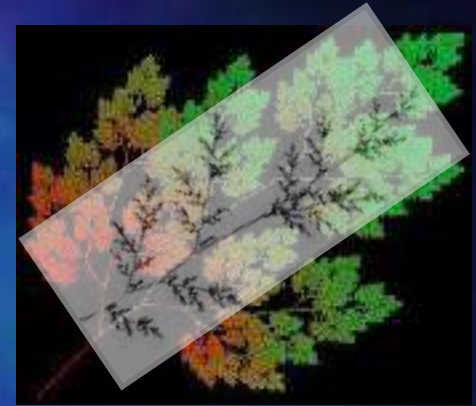


Linear Fractals



Nonlinear Fractals

Linear Fractals

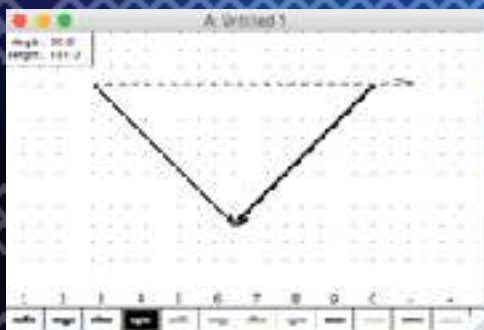
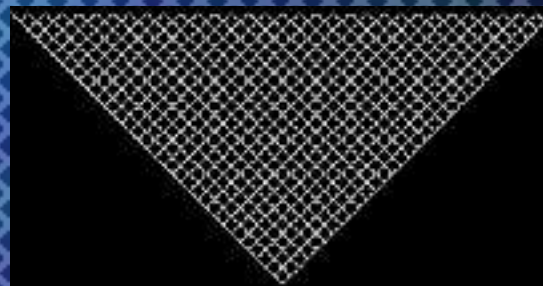
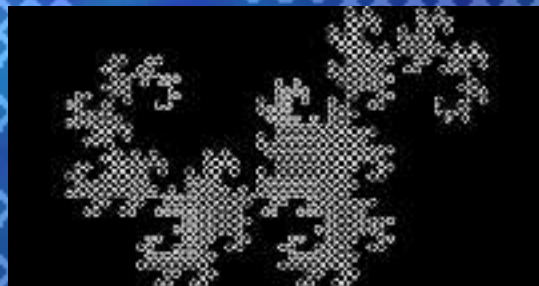
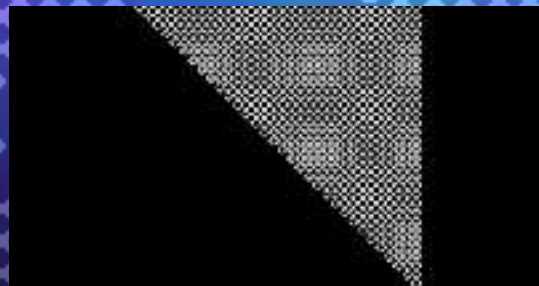


"Triangles outside triangles
outside triangles ad infinitum
the Koch curve goes, it's
infinitely infinitesimal, this
self-similarity shows. Although
too great to measure, an area
too small to see, what else can
this contradiction be, behold
fractal geometry."
-The Fractal Explorer [1995]

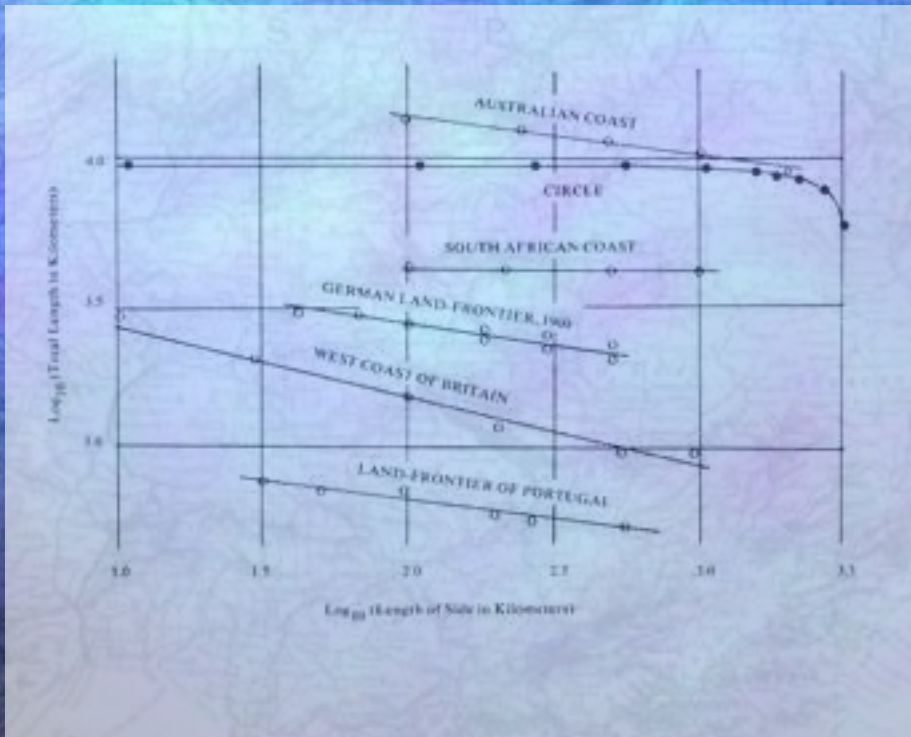
Koch Curve



Dragon Curve

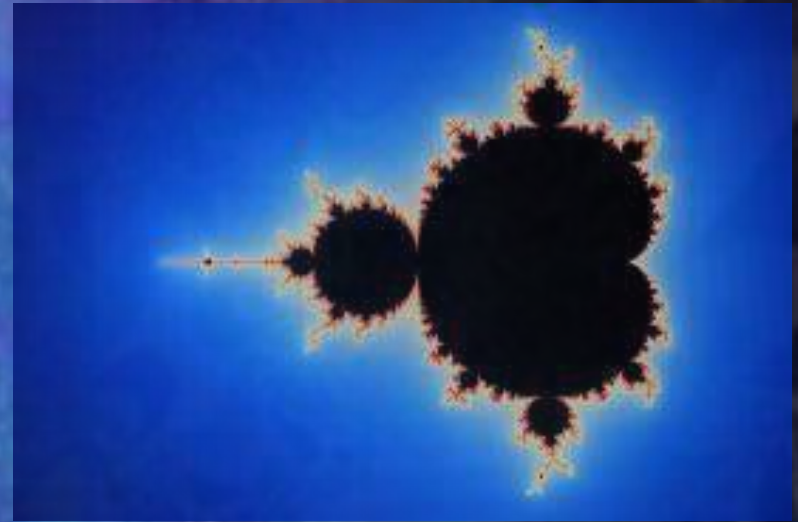


Measuring a Coastline

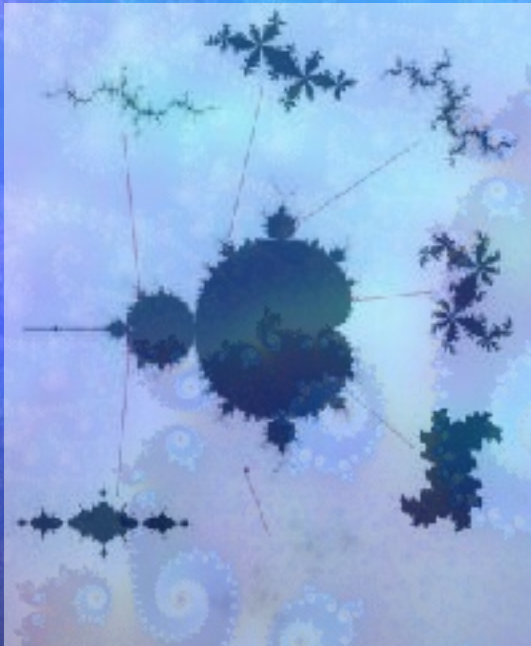


SPAIN AND PORTUGAL

Nonlinear Fractals

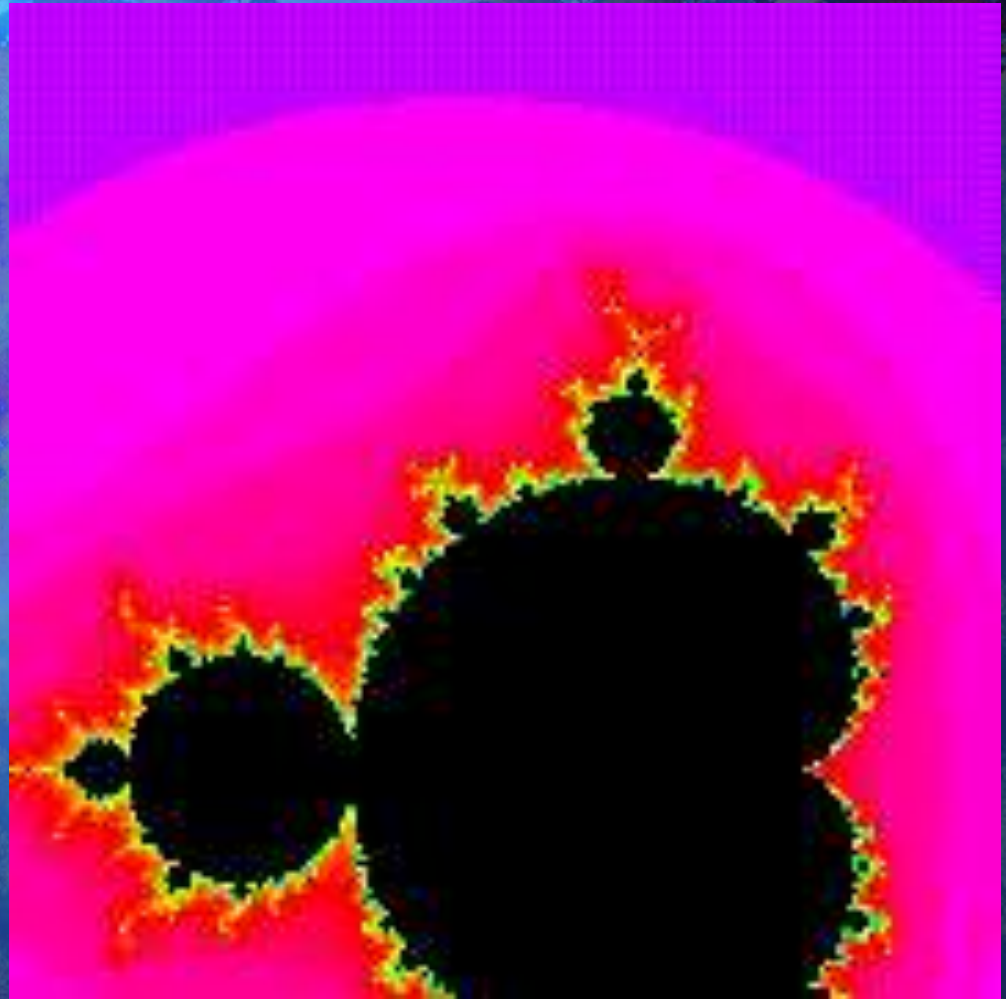


Mandelbrot and Julia Sets



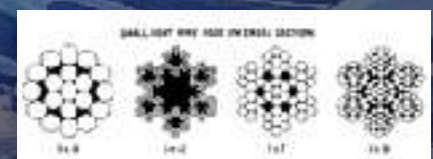
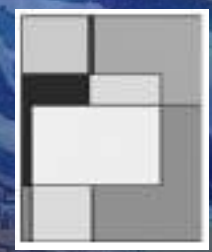
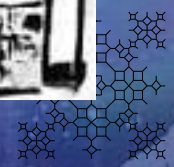
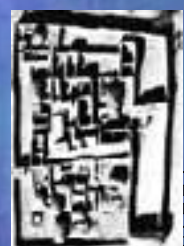
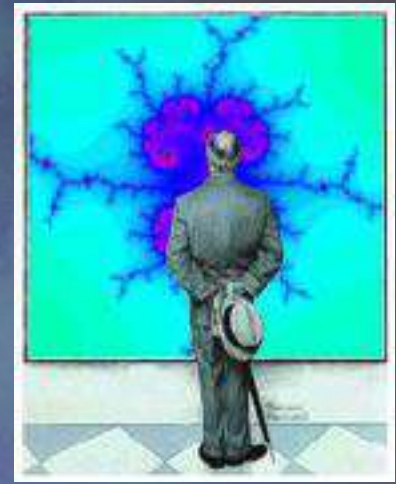
$$z \rightarrow z^2 + c$$

Mandelbrot

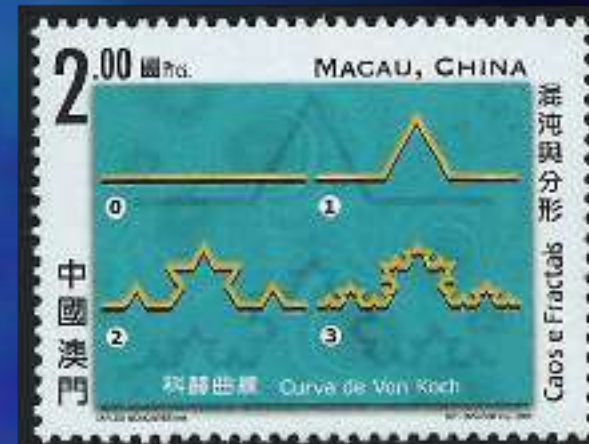


富嶽三千峯 赤松川津 破表

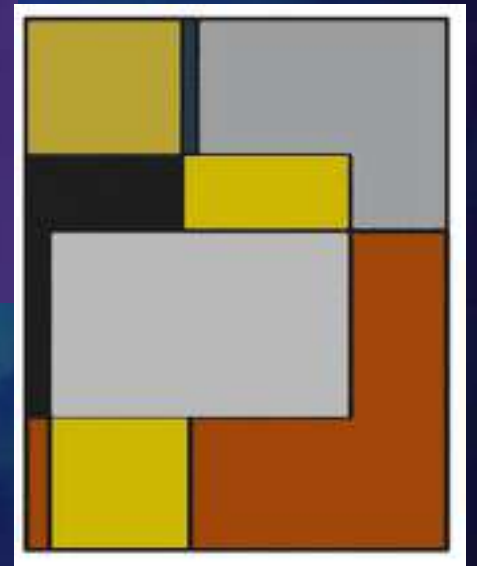
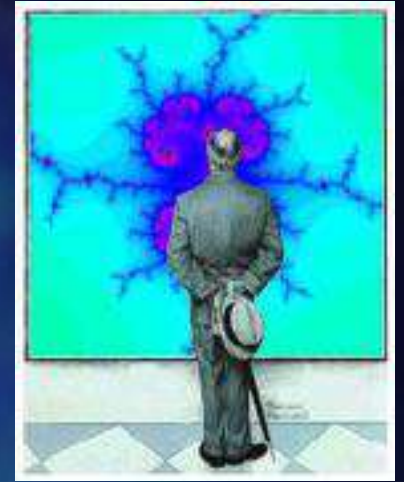
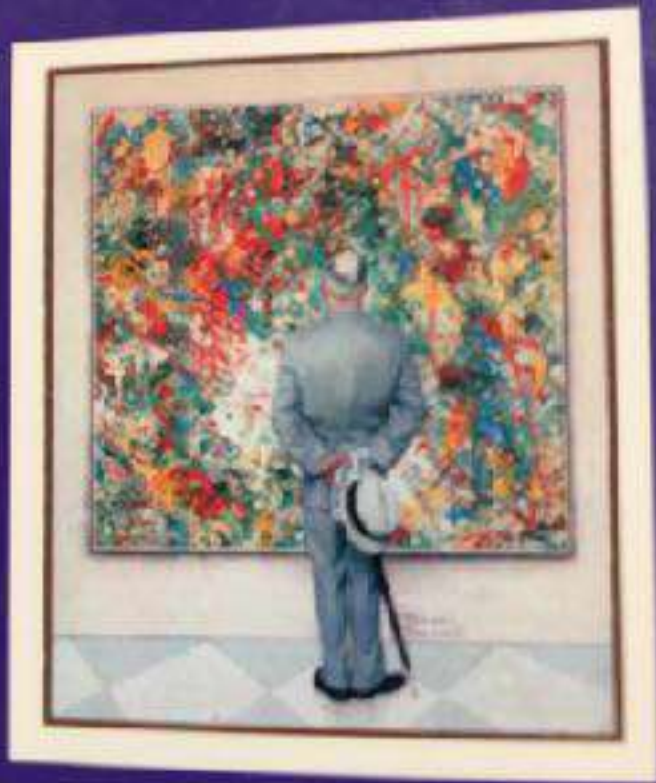
Fractals in Our World



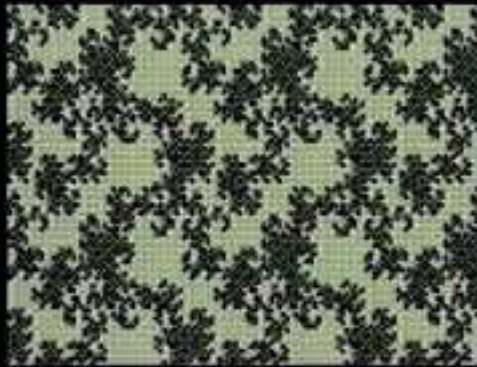
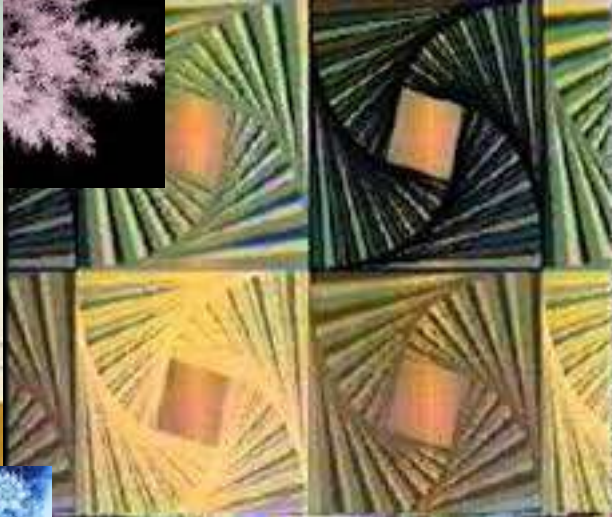
Culture



Art



Fashion



• <https://youtu.be/luRhy2aimRI>

Trees

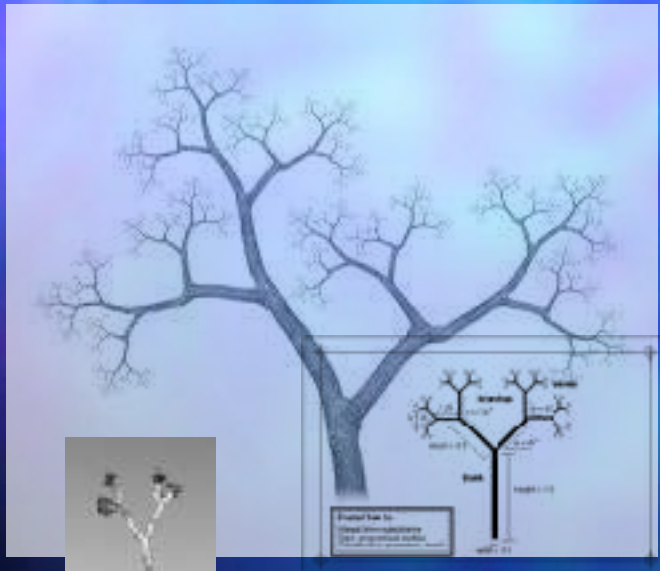


Fractal out line of a European beech with



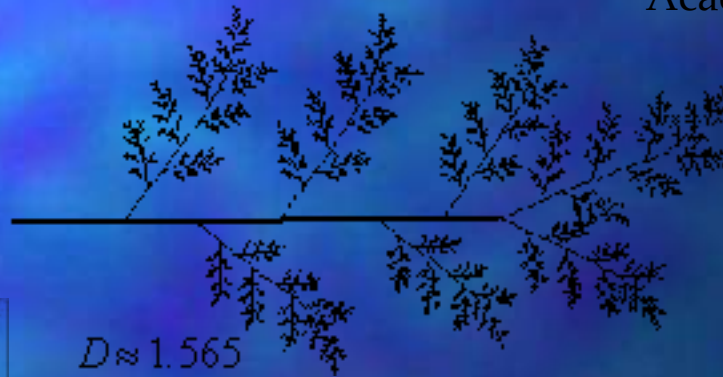
$D \approx 1.367$

Acacia or Umbrella Tree with



$D \approx 1.565$

Elm tree branch with .



Use Machine Learning to find DNA for classification: structure patterns, randomness