

EXPLORING FIBONACCI IN 4 DIMENSIONS

Jelle Hamoen (s2189488) – Art, Math and Technology – 19-06-2019

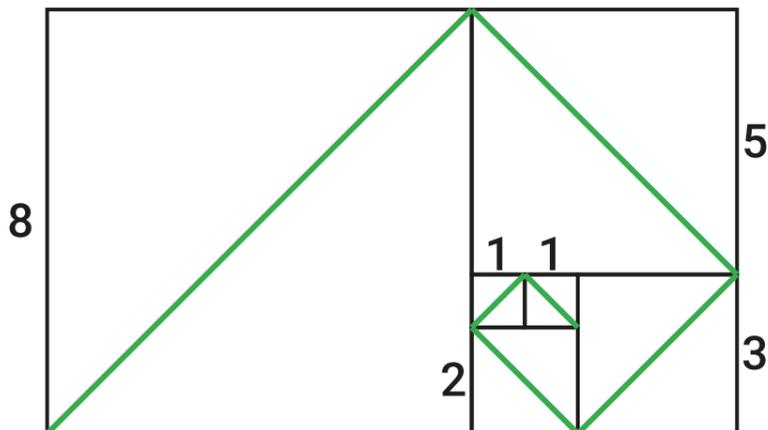
What the heck is THAT? How even? ~paraphrased quote from a colleague*

While 4 dimensions, or even 5 or more are relatively easy to capture in mathematical matrices and coordinate systems, it is mindboggling to the human mind. Even the relatively simple "Hypercube" is hard to process. However the 4th dimension is all around us and runs through parts of our cutting edge mathematics and physics. It feels very unnatural however, there is not a lot from nature you can recognise in most 4D shapes.

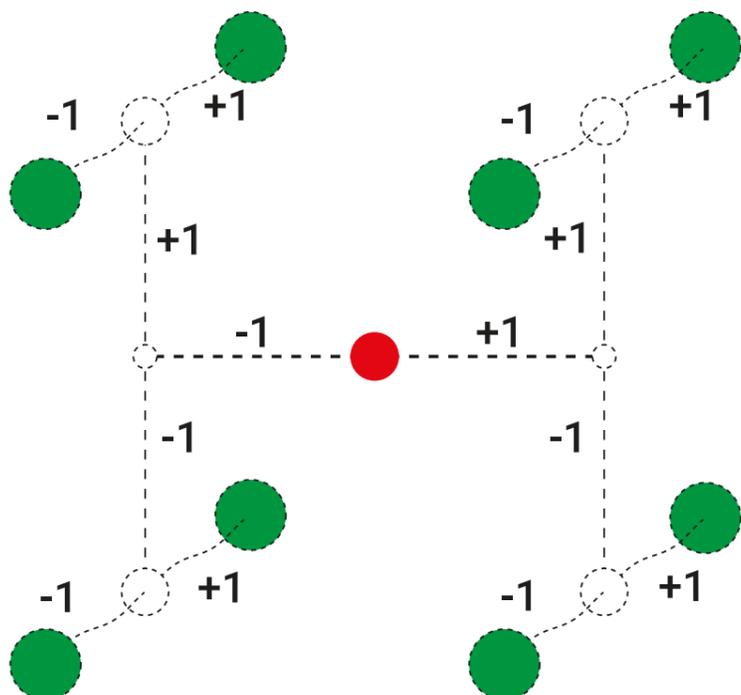
The Fibonacci sequence (1,1,2,3,5...(F_{n-1} + F_{n-2})) is a widely known sequence, widely adopted in the arts. And while exploring 4d shapes, I've made the discovery that the number φ appears regularly in but nature and in 4D. In 4D regular triangular shapes and polygons usually have φ as ratios in relative distances. Maybe this can be exploited to create a sense of nature in 4D? This is the vision I set out with, attempting to create a 4D nautilus shell...

THE MATHEMATICS

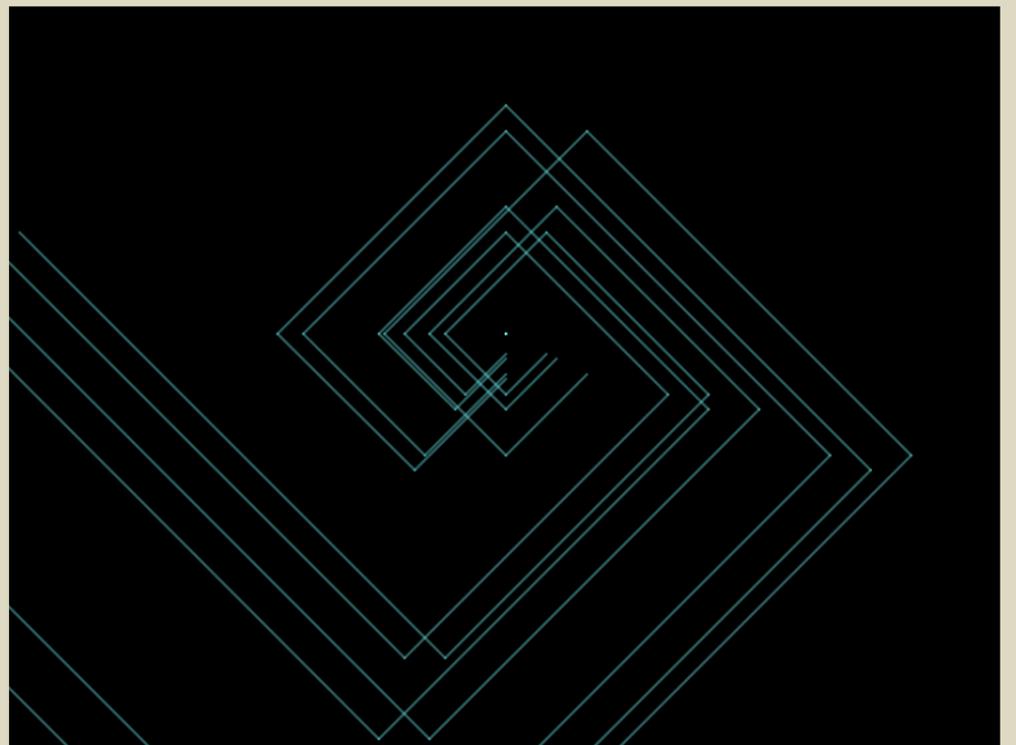
The 4D Nautilus shell is constructed from a Fibonacci spiral, which is given form by the Fibonacci sequence.



From each point on the Fibonacci spiral, a new point is translated in the x/y, z and ω. Each subsequent point is then connected with a line to form my representation of a 4D Nautilus Shell, based on modified open source code by nking (<https://www.openprocessing.org/sketch/205544/>)



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Screenshot of the Artwork when in the starting position, you can see the Fibonacci spirals

The 4d Nautilus shell is an exploration into creating a 4d variant of the nautilus shell. This shape is rather geometric, as curves in 4D will not only fry your brain, but also slow down the simulation to a crawl.

The nautilus is constructed from multiple spirals, translated from a Fibonacci spiral in 4 dimensions. It offers visitors the possibility to interact and rotate the shell in 4D space and try to form an understanding of what's happening. *Try and see!*

So, what is the golden ratio?

The Golden ratio is a specific ratio which has grappled the fascination of many people, it is a certain ratio which appears over and over again in both mathematics and nature. Appearing in both sunflowers and pentagons, along with many other places.

$$\varphi = \frac{a+b}{a} = \frac{a}{b} \approx 1.6180339887 \dots$$

or approximately

*This quote has been translated from dutch to english and made appropriate for this poster