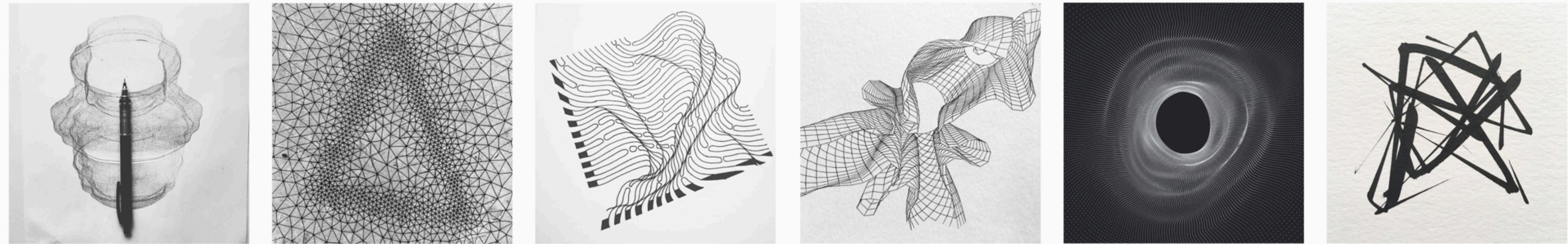
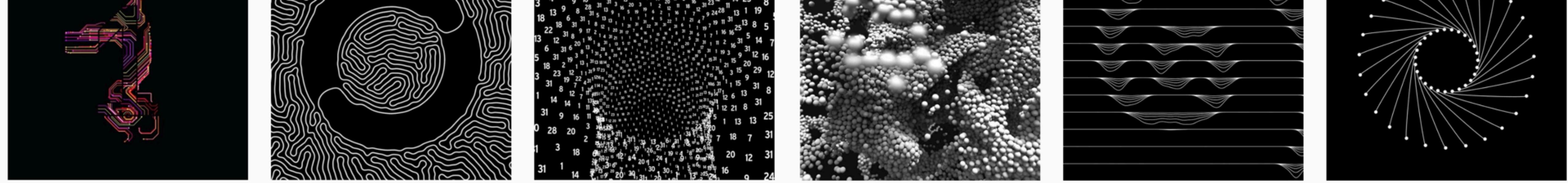


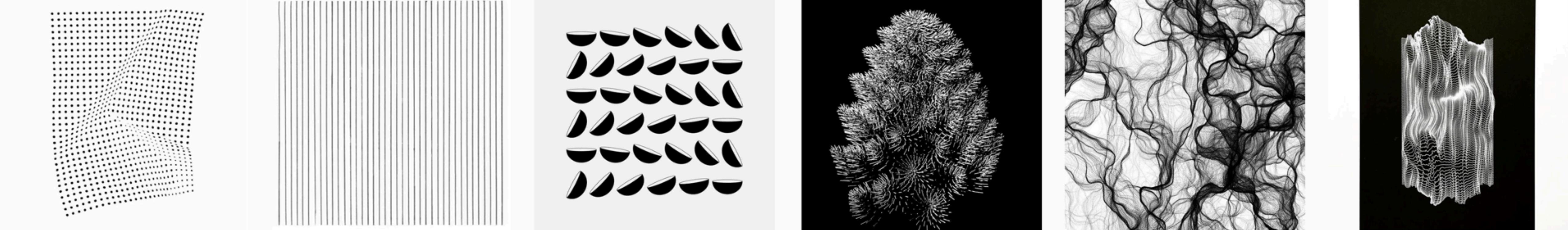
GENERATORS

Procedural content generation techniques

Lior Ben-Gai
August 2019



Generative Art

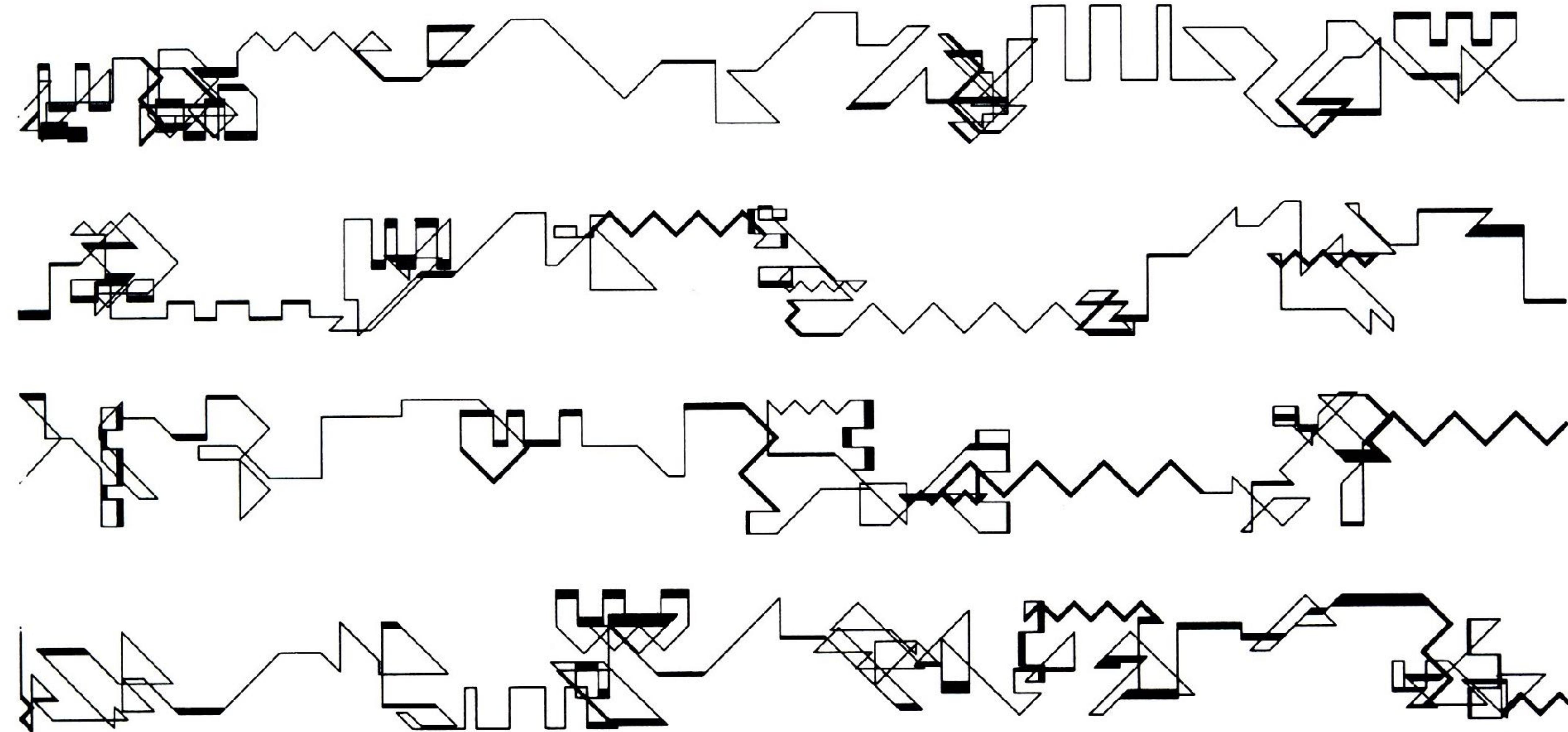


<https://www.instagram.com/dvdp/>
<https://www.instagram.com/generative.hut/>
[https://www.instagram.com/in.white.rooms_ /](https://www.instagram.com/in.white.rooms_/)



<http://reas.com/>

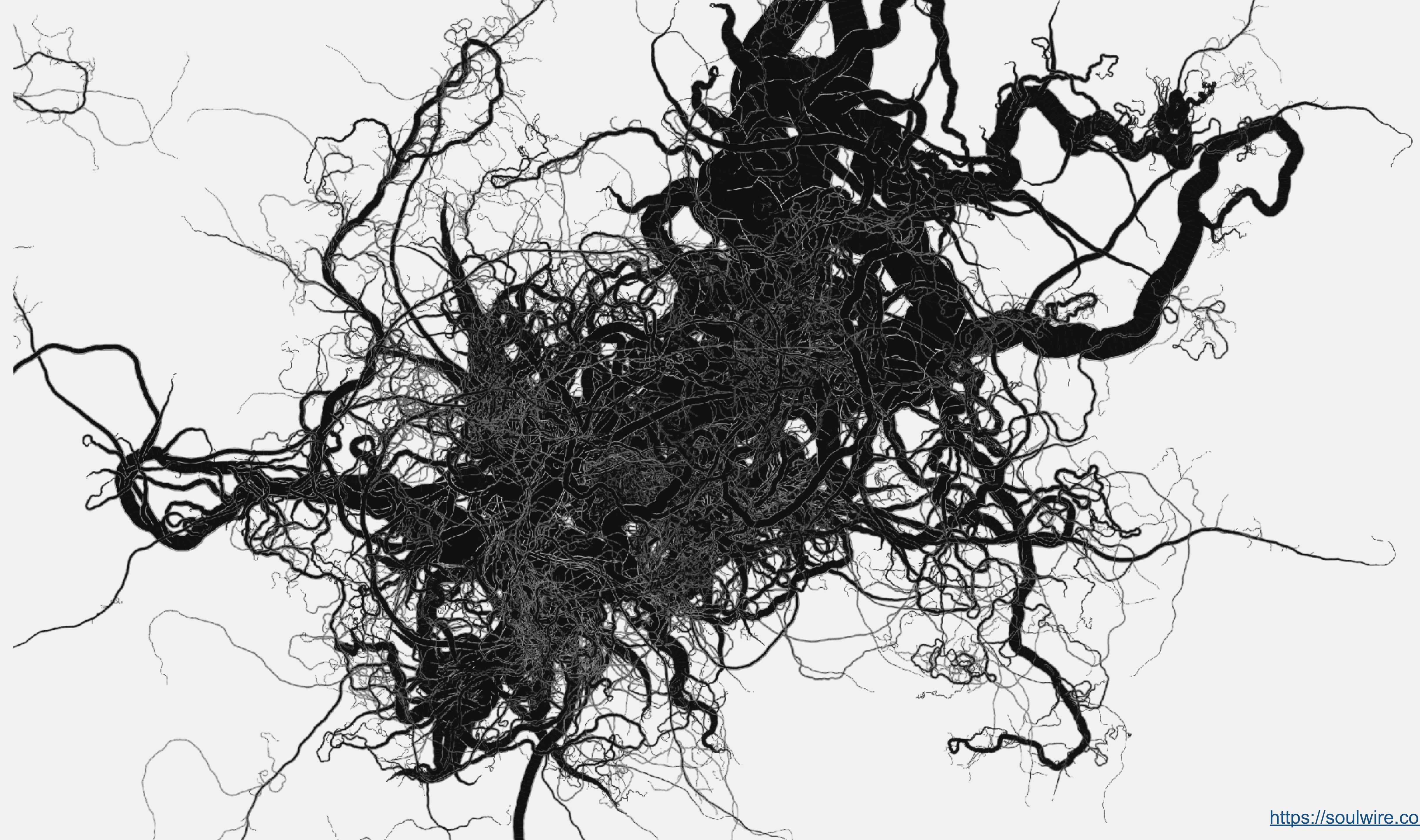
https://www.youtube.com/watch?v=_8DMEHxOLQE



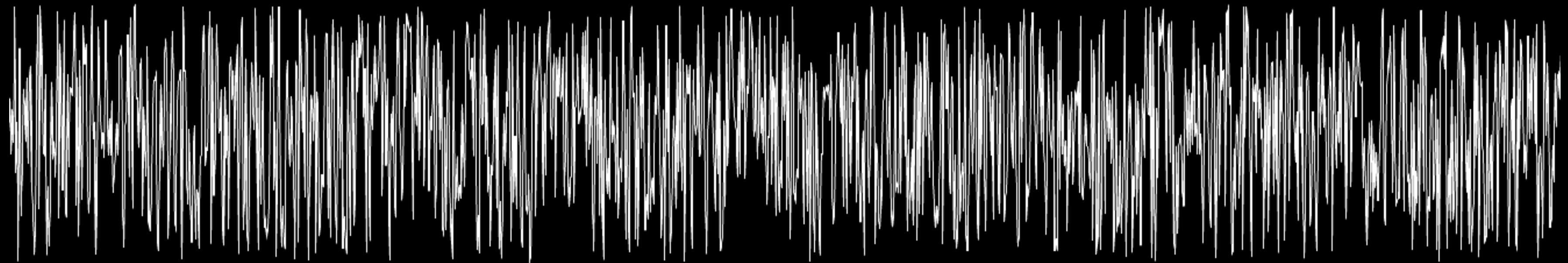
PROG.21

MOHR 70

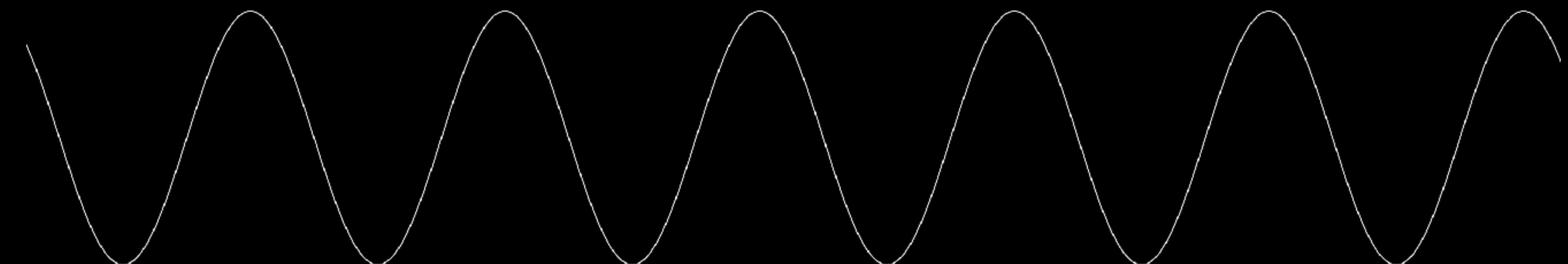




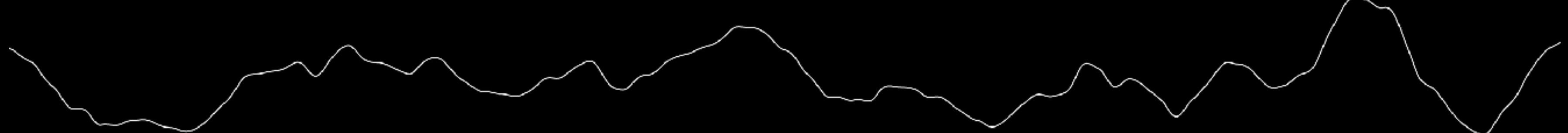
(Pseudo) Random



Sine (wave)

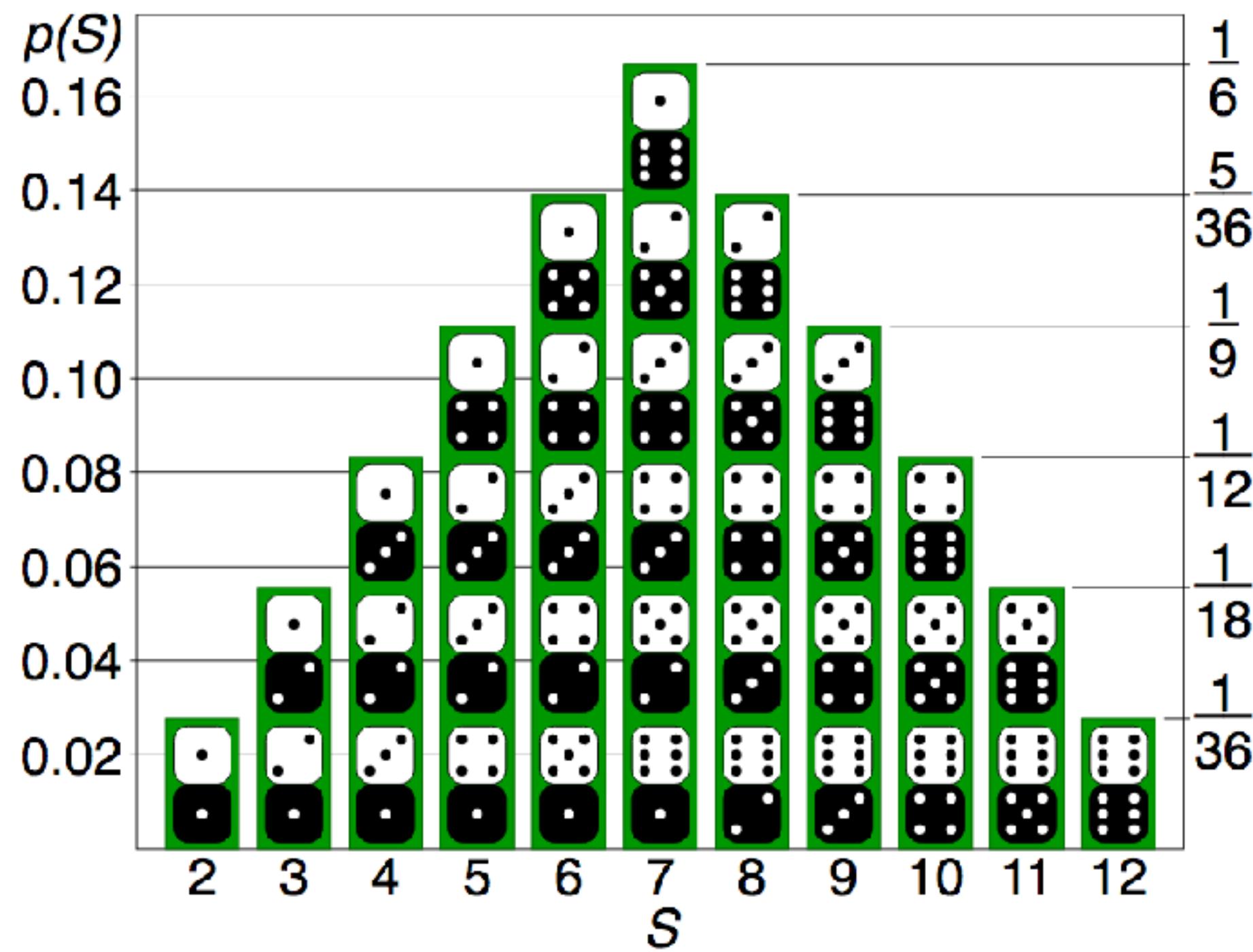
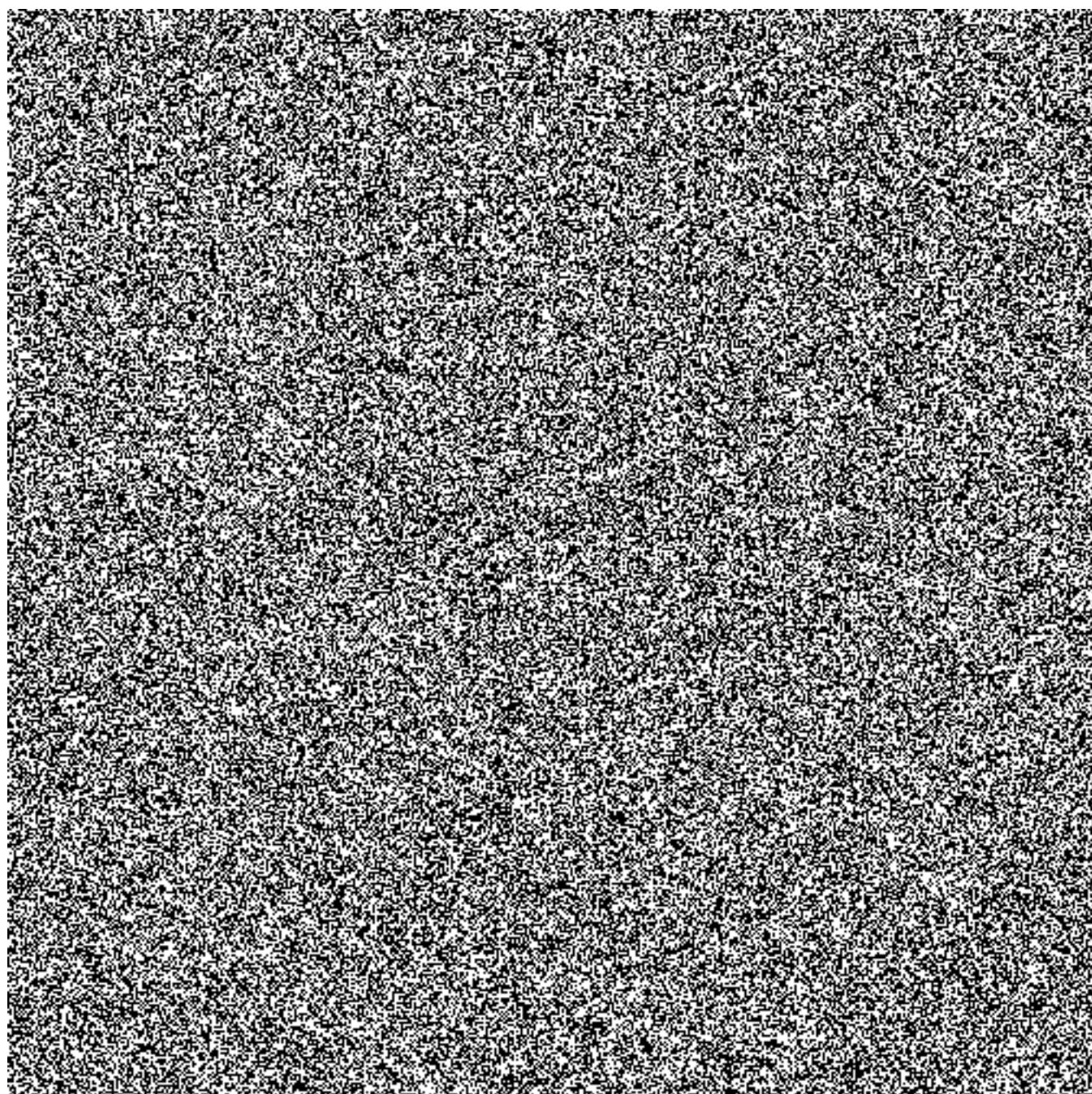


(Perlin) Noise





RANDOM

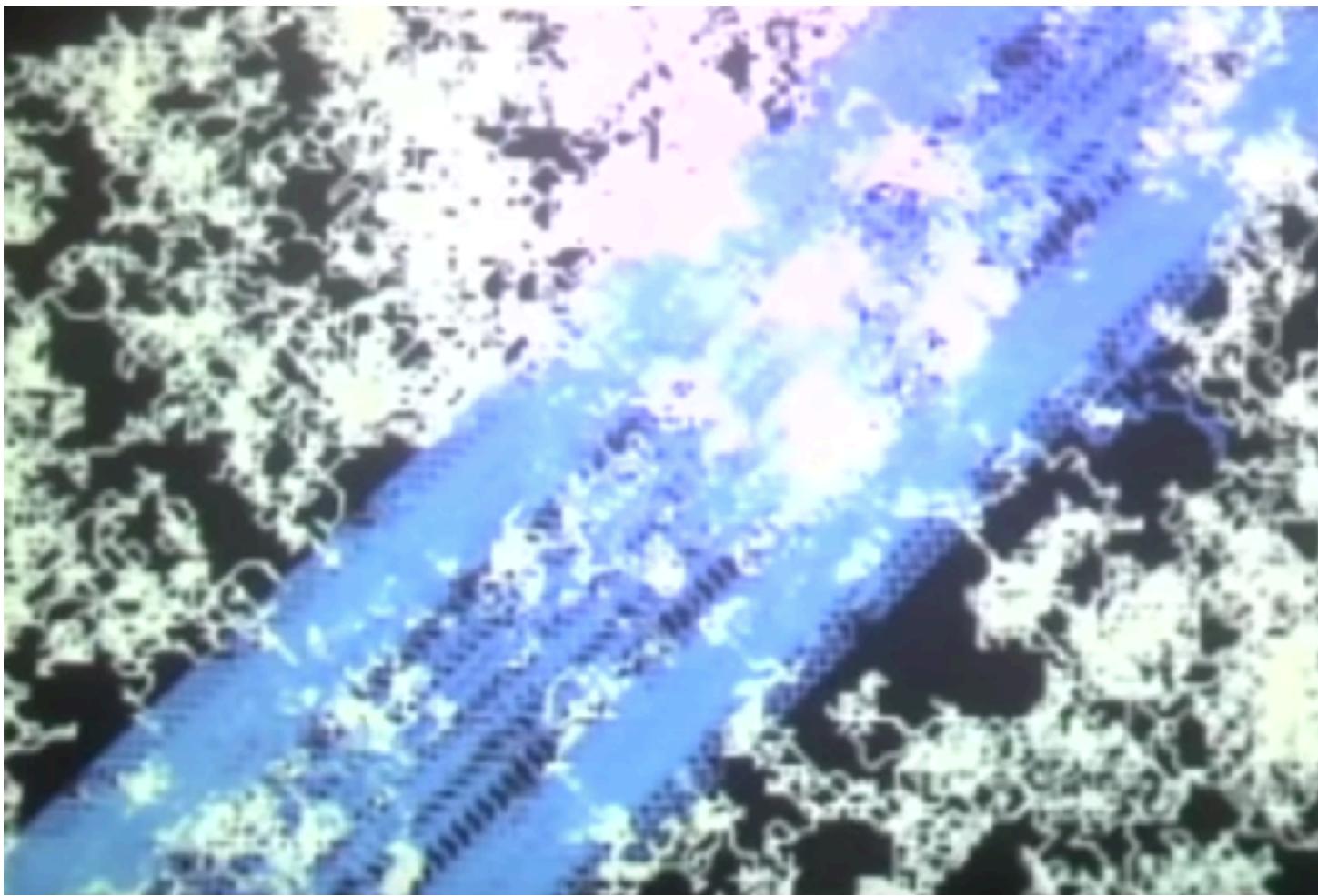


RANDOMNESS

Randomness is the lack of [pattern](#) or [predictability](#) in events.^[1] A random sequence of events, [symbols](#) or [steps](#) has no [order](#) and does not follow an intelligible pattern or combination. Individual random events are by definition unpredictable, but in many cases the frequency of different outcomes over a large number of events (or "trials") is predictable. For example, when throwing two [dice](#), the outcome of any particular roll is unpredictable, but a sum of 7 will occur twice as often as 4.

<https://en.wikipedia.org/wiki/Randomness>

PSEUDO-RANDOMNESS



<https://www.youtube.com/watch?v=GtOt7EBNEwQ>

A **pseudorandom** process is a process that appears to be **random** but is not. Pseudorandom sequences typically exhibit **statistical randomness** while being generated by an entirely **deterministic causal process**. Such a process is easier to produce than a genuinely random one, and has the benefit that it can be used again and again to produce exactly the same numbers - useful for testing and fixing software.

<https://en.wikipedia.org/wiki/Pseudorandomness>

https://en.wikipedia.org/wiki/Deterministic_algorithm

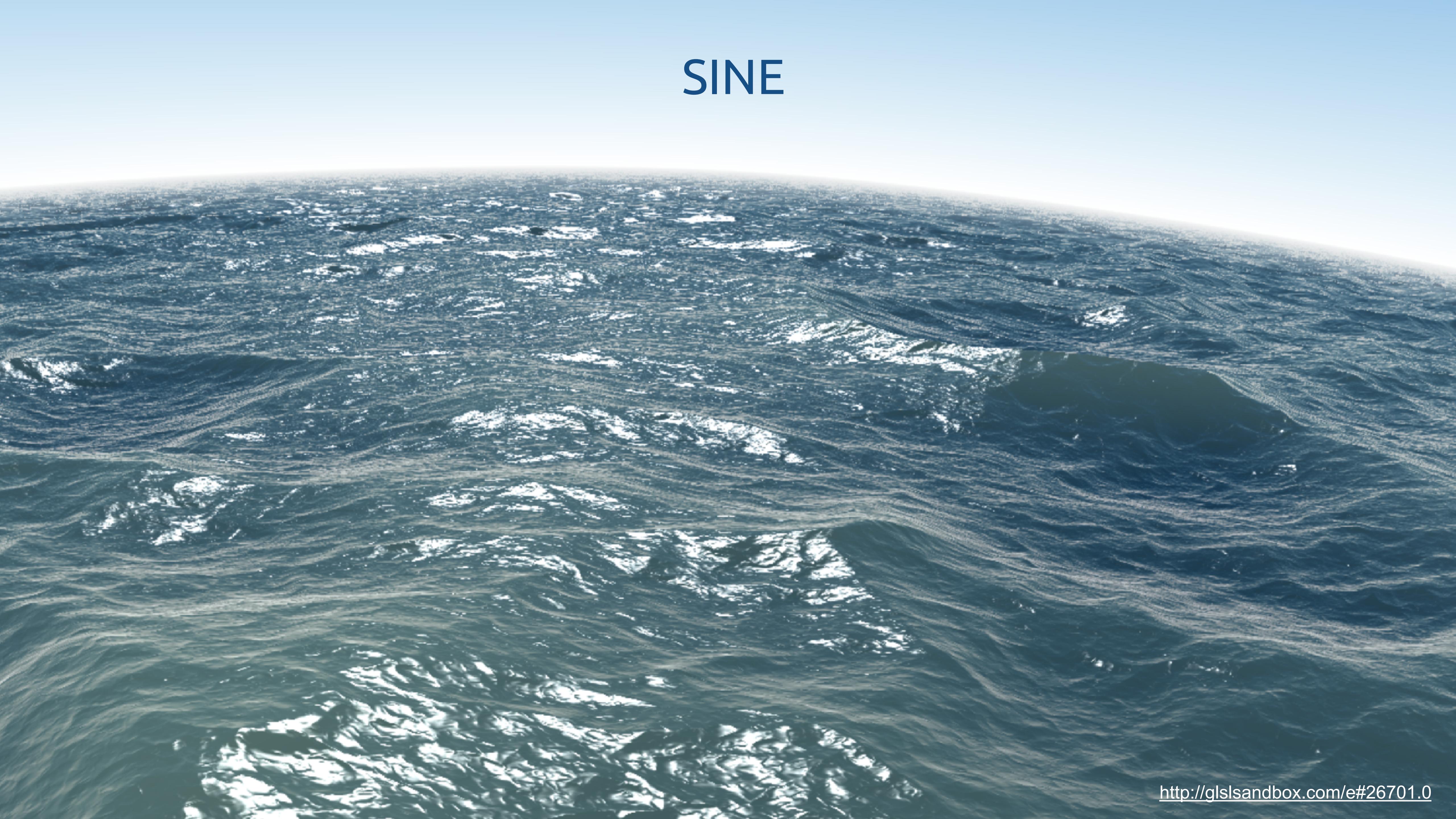
For true random numbers, visit: **RANDOM.ORG**

IS THAT THE SAME AS CHAOS?

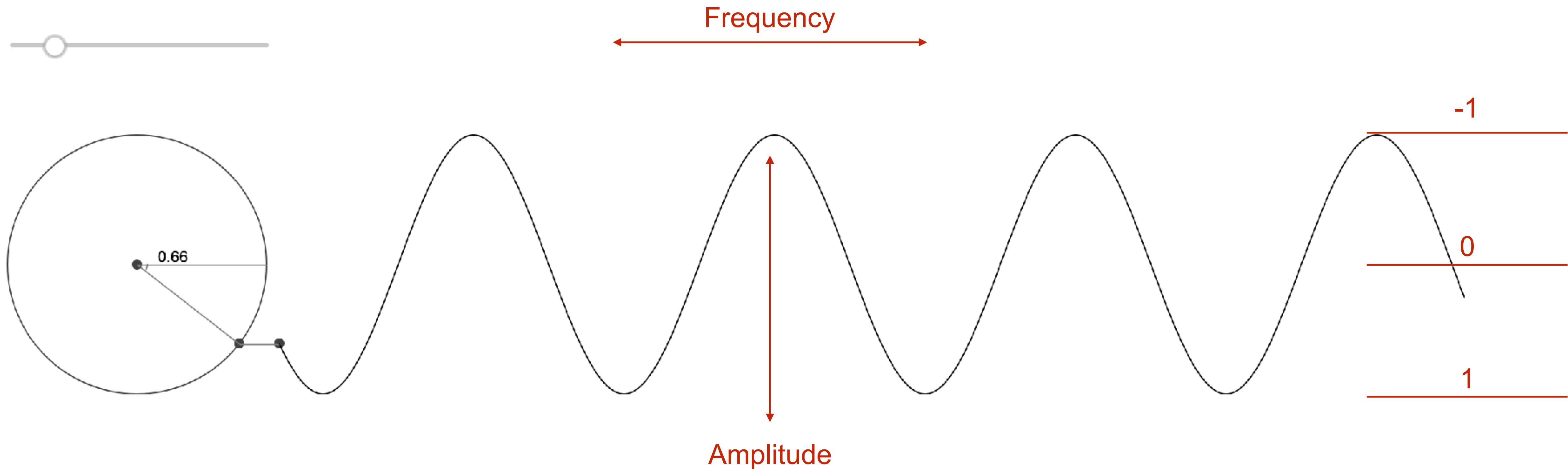
Well, not exactly.

Chaos theory is the field of study in **mathematics** that studies the behavior of **dynamical systems** that are highly sensitive to initial conditions—a response popularly referred to as the **butterfly effect**.^[1]

SINE



SINE WAVE



<https://codepen.io/soogbet/pen/eqpLLB?editors=0010>

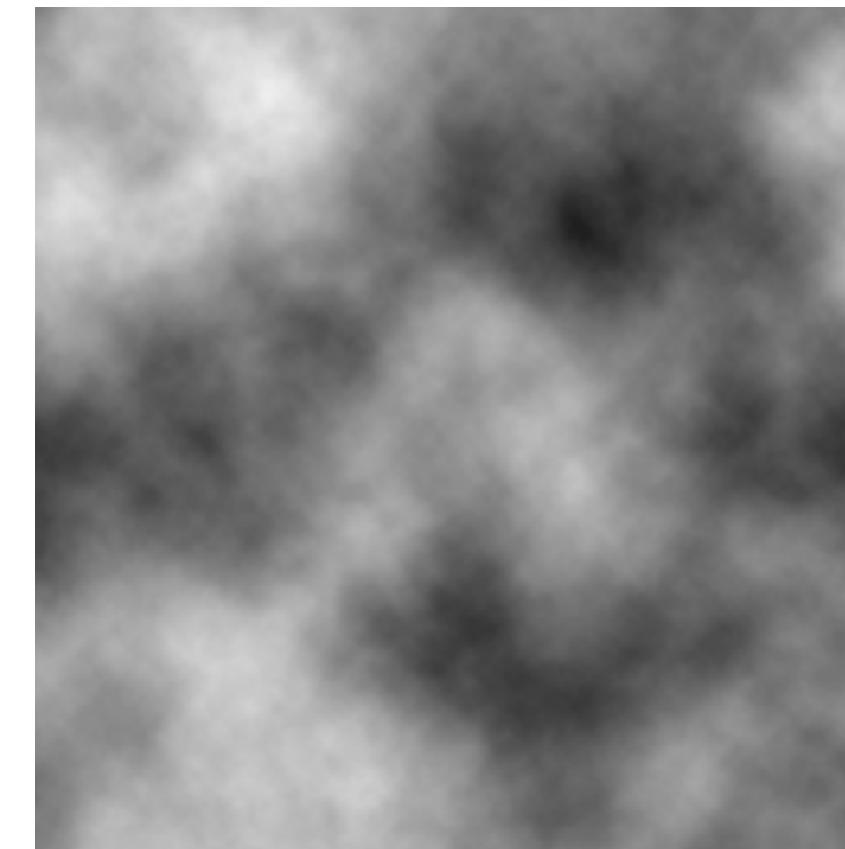
https://en.wikipedia.org/wiki/Sine_wave

NOISE



[Blackout by Dan Holdsworth](#)

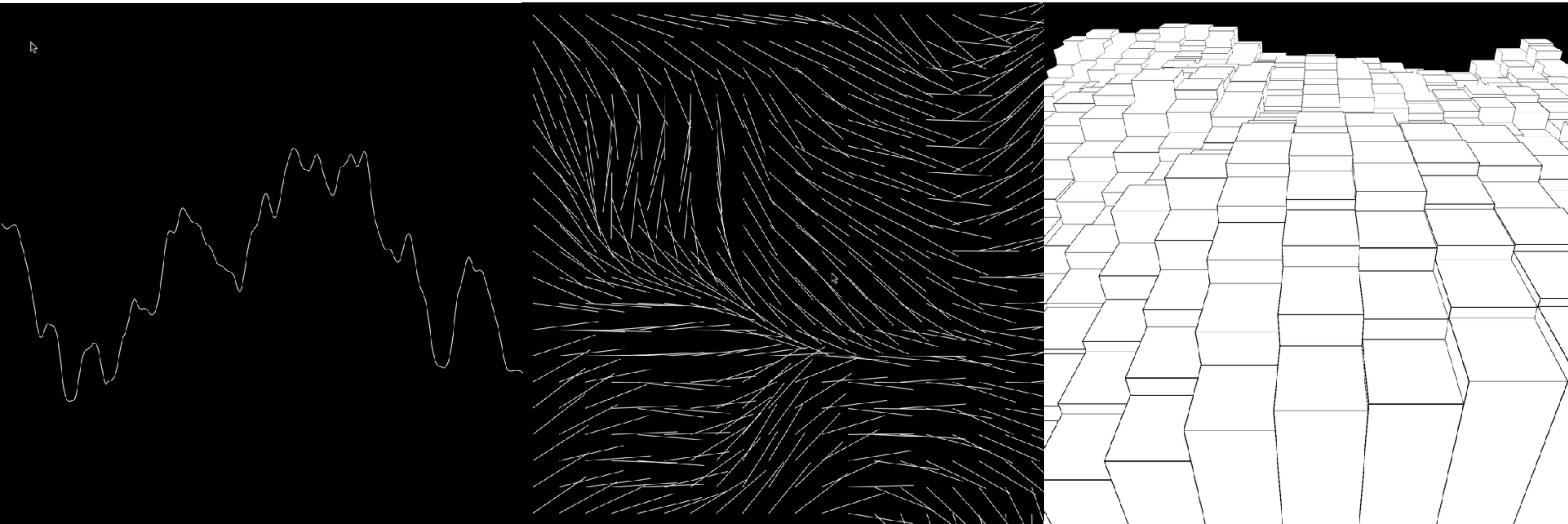
PERLIN NOISE



Perlin noise is a type of gradient noise developed by [Ken Perlin](#) in 1983 as a result of his frustration with the "machine-like" look of [computer graphics](#) at the time.^[1] He formally described his findings in a [SIGGRAPH](#) paper in 1985 called *An image Synthesizer*.^[2] In 1997, Perlin was awarded an [Academy Award for Technical Achievement](#) for discovering the algorithm:^[3]

https://en.wikipedia.org/wiki/Perlin_noise

PERLIN NOISE



<https://codepen.io/soogbet/pen/GVoXOd?editors=0010>

1D

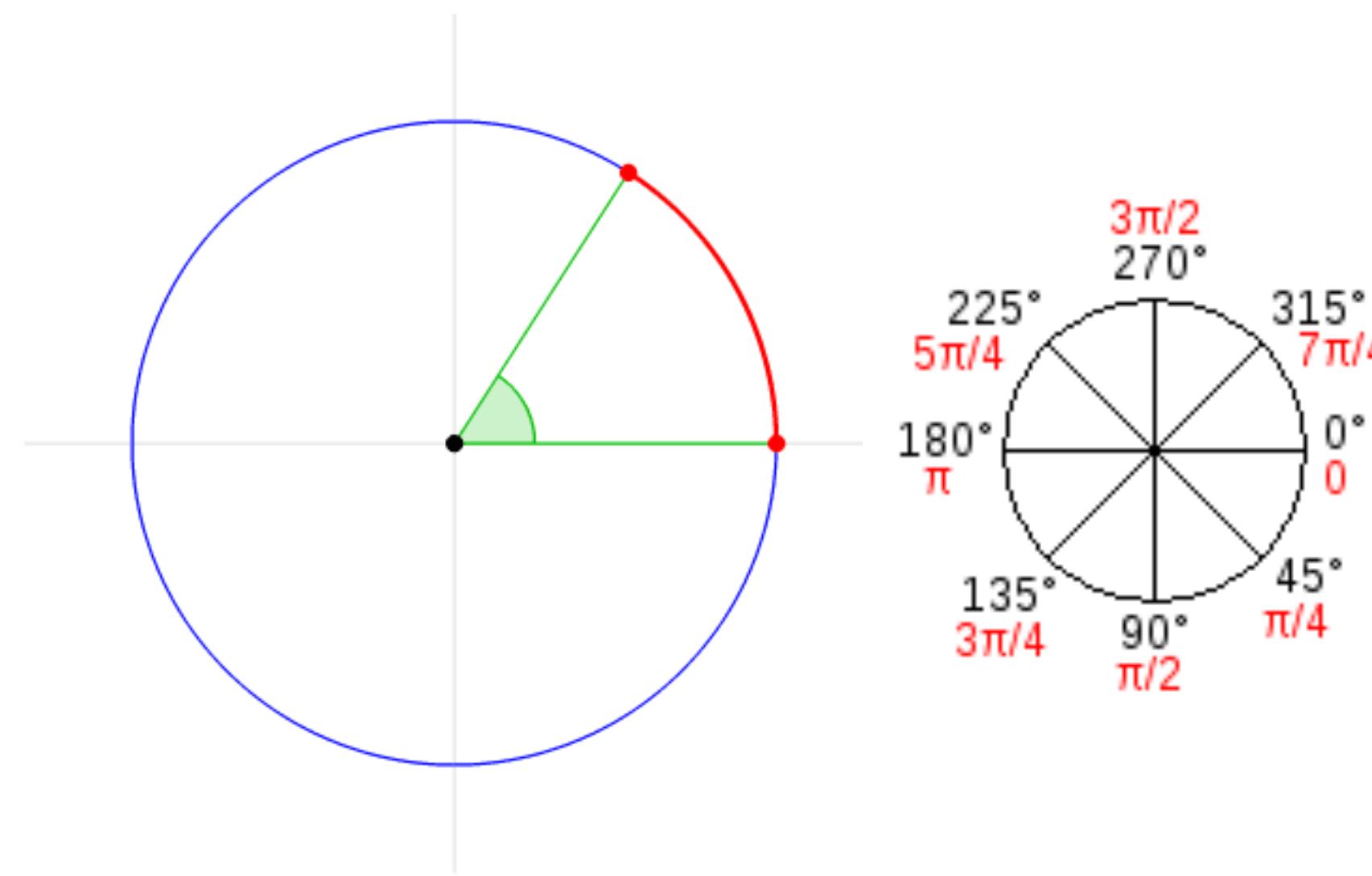
<https://codepen.io/soogbet/pen/pMgOLz?editors=0010>

2D

<https://codepen.io/soogbet/pen/voLQXO?editors=0010>

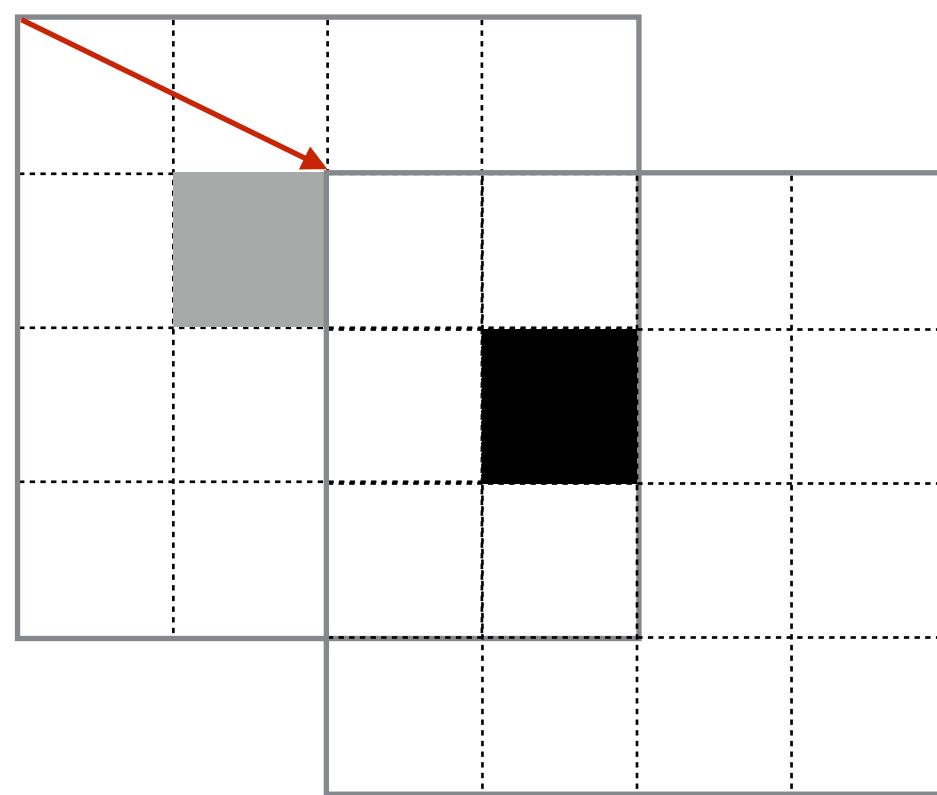
3D

RADIANS

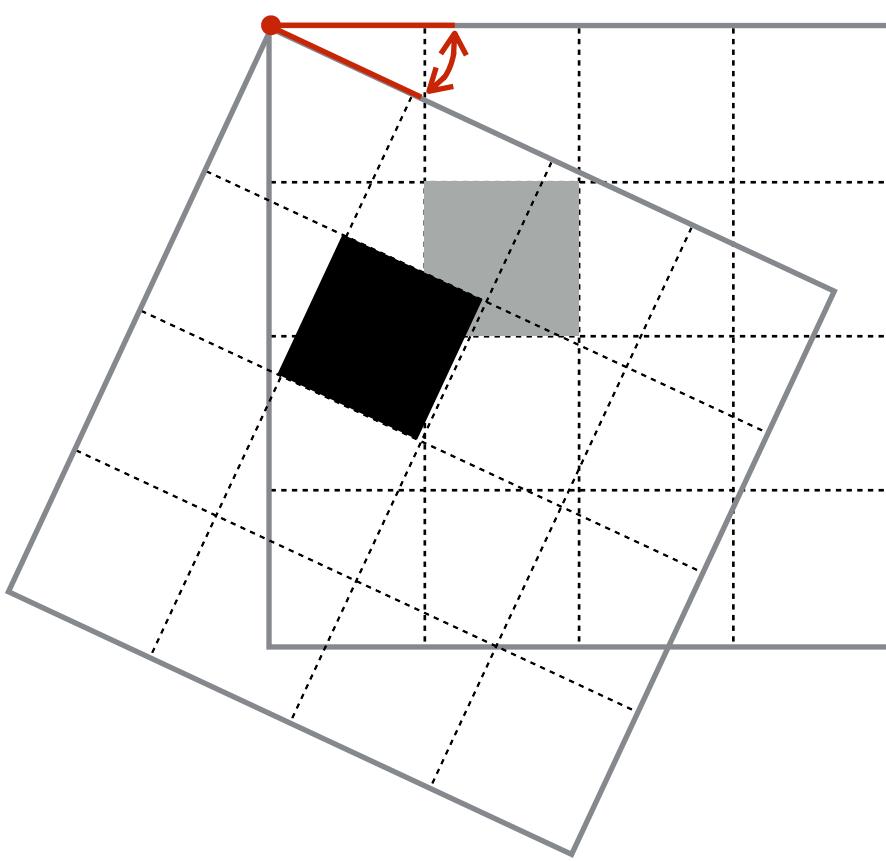


<https://en.wikipedia.org/wiki/Radian>

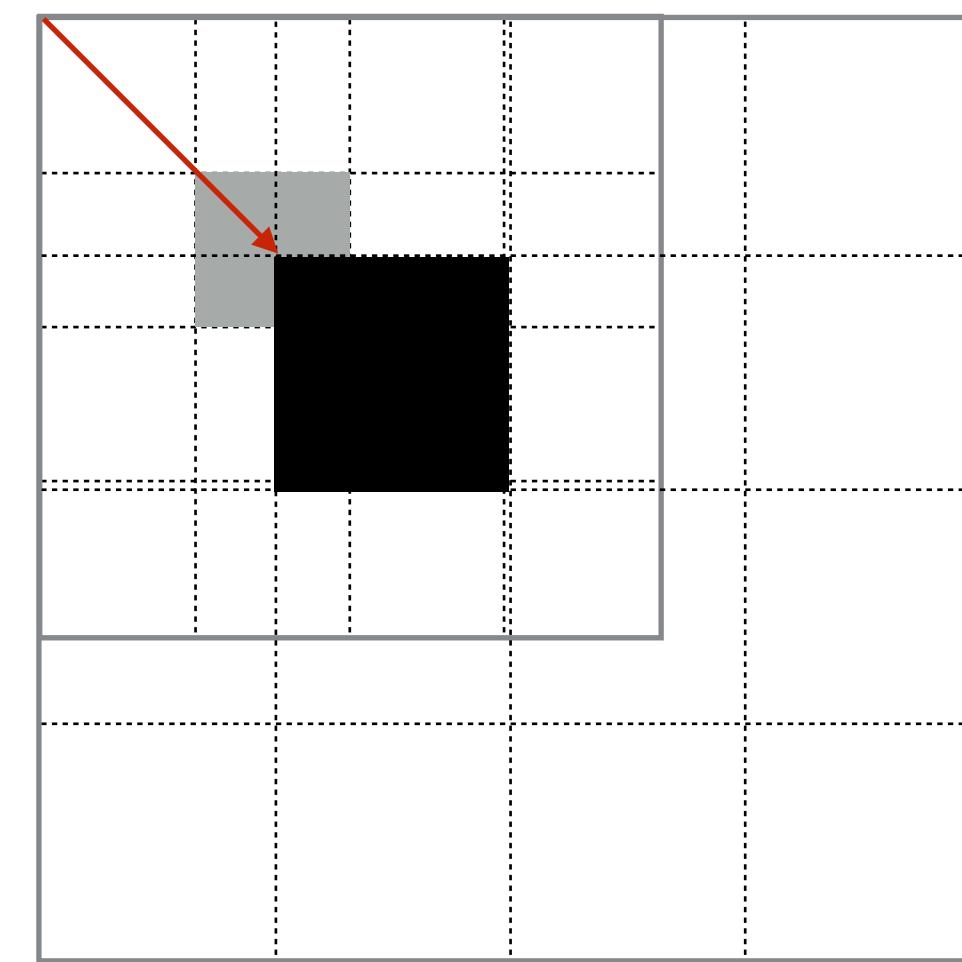
2D TRANSFORMATIONS



translate



rotate



scale