Algorithmic Art

by Sinan Kapçak

The basis of this work lies in the realm of Discrete Dynamical Systems (DDS), a field of mathematics that finds its applications in a multitude of scientific disciplines including engineering, economics, and biology.

A two-dimensional DDS, also known as planar map, is a function that yields a set of ordered points in the plane. Starting from an initial point, the application of the DDS to that point results in a second point. Subsequently, applying the DDS to the second point generates a third point, and the process repeats itself, creating as many points as needed. The resulting set of ordered points is called an orbit of the system.

The algorithmic art I produce relies on planar maps as its foundation. To create images, I manipulate various artistic parameters such as the geometry, color, and opacity of objects located at points within the orbit of the system. Through the use of an algorithm, these parameters can be changed linearly, hyperbolically, exponentially, or defined using a specific function.

About the Artist

Sinan Kapçak, born in Diyarbakır, Turkey in 1978, held his first solo art exhibition at the young age of nine. He won the first prize in the local art contest for Forest Week, and received the local winner award for the art contest held for Teacher's Day in 1992, and for Tax Week in 1994.

In 2001, he graduated from Akdeniz University, Turkey with a degree in Mathematics, and in 2007 he received a Masters of Mathematics degree from Izmir Institute of Technology, Turkey. During his fall semester in 2006-2007, he studied at the University of Cantabria in Spain at the Department of Applied Mathematics and Computational Science.

In 2010, Sinan Kapçak won a national award in Turkey for his graphic design entry for the poster of the Izmir European Jazz Festival in 2010. He also designed logos for various companies. In the fall semester of 2012, he studied on DDS and Mathematical Modeling at Trinity University in the USA. Later, he completed his Ph.D. in the Graduate Program of Applied Mathematics and Statistics at Izmir University of Economics, Turkey. He has been working at the Department of Mathematics, College of Engineering at AUM since 2013. His research interests include DDS and Difference Equations.

In 2018, he began creating algorithmic artworks using DDS. He then presented the technique at the renowned Bridges Conference, and published as a conference proceeding, in 2020, titled “Algorithmic Art with Discrete Dynamical Systems.” This conference is recognized as a leading platform for exploring the intersection of art and mathematics.