

Abstract

We propose a novel machine learning algorithm inspired by complex analysis. Our algorithm has a better mathematical formulation and can approximate universal functions much more efficiently. The algorithm can be implemented in two self-learning neural networks: The CauchyNet and the XNet. The CauchyNet is very efficient for low-dimensional problems such as extrapolation, imputation, numerical solutions of PDEs and ODEs. The XNet, on the other hand, works for large dimensional problems such as image and voice recognition, transformer and large language models. We implemented our algorithm for many scenarios, showing that it is very efficient and accurate. It is much better than many popular PINN (Physically Inspired Neural Network) models in various scientific computations; It outperforms KAN (Kolmogorov Arnold Network); For a set of medical image we tested, it can increase accuracy from 88% to 98%. Our algorithm is currently being tested on large language models. Small scale testing shows great promise.