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Basins of Attraction for Electronic Neural Networks

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Abstract:

We have studied the basins of attraction for fixed point and oscillatory attractors in an electronic analog neural network.

Basin

measurement circuitry periodically opens the network feedback loop, loads raster-scanned initial conditions and examines the resulting attractor. Plotting the basins

for fixed points (memories), we show that overloading an associative memory network leads to irregular basin shapes.

The network also

includes analog time delay circuitry, and we have shown that delay in symmetric networks can introduce basins for oscillatory attractors.

Conditions leading to oscillation are related to the presence of frustration; reducing frustration by diluting the connections can stabilize a

delay network.

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