Name(s)	Project Number
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Project Title

Fractal Antennas: Fractal Geometry and Wireless Networks

Abstract

Objectives/Goals

Through our project, we wanted to measure the effectiveness of increasing the number of iterations of a fractal in a fractal antenna and the wireless signal reception strength as a result. We believe that fractal iteration and signal strength have a direct and linear relationship.

Methods/Materials

We have built 6 iterations of a fractal antenna from aluminum foil. We tested each of their signal strengths by connecting them wirelessly to a router, and measured the signal strength using a computer program on a Linux OS laptop.

Results

Our data shows that increasing the fractal iteration by one, on average, increased the wireless reception strength by approximately 1-2 decibel-milliwatts. Though, the wireless router did fluctuate leading to a somewhat substantial margin of error.

Conclusions/Discussion

Drawing from the gathered data, we have learned that increasing the number of iterations increases signal strength tremendously since decibel milliwatts are a logarithmic unit. It did not support our hypothesis that the relationship would be linear; the relationship is direct and exponential. Though the data did have a somewhat substantial margin of error, we believe that the amount of data gathered offsets the error.

Summary Statement

Through our project, we wanted to measure the effectiveness of increasing the number of iterations of a fractal in a fractal antenna and the wireless signal reception strength as a result.

Help Received

Consulted with my father on how to measure the wireless signal strength; Consulted with my physics teacher, Doug Miller, on how to control external variables