# Collatz Conjecture

Big things come in small packages. From tiny acorns grow mighty oaks. Never judge a book by its cover. These familiar euphemisms try to capture, in a pithy way, the basic idea that simple looking systems can often hide a surprising amount of complexity. This basic observations couldn’t more true than in the case of the Collatz Conjecture.

The Collatz Conjecture is so simple that, on the face of it, it must be easy to prove. But like other easily state suppositions in mathematics, the proof, if one exists, must be particularly difficult to construct.

In a nutshell, the Collatz Conjecture says that a particular process, described just below, when repeatedly applied to any integer always ends up the same way, regardless of the starting value of the integer. The process is as follows:

* If the integer is even, divide it by 2
* If the integer is odd, multiply it by 3 and then add 1

There it is. It is so simple that it can be implemented in a few lines in just about any language, even COBOL. And yet,

The first indication is (simple examples)

The hail storm behavior of the amount of time before reaching the value of 1 is something to behold.

<graph>

Quote about mathematics not being built for it.

Some other stuff.

Game of Life

Plasma Frequency

NU Part 3