

RESEARCH STATEMENT

Original Creative Work

Citation: Noel Patson 2009, Recorded or Rendered Work, Web Exhibition, *Number of Repeating Digits in Base b Expansion of Fractions* Wolfram Mathematica.

<http://demonstrations.wolfram.com/NumberOfRepeatingDigitsInBaseBExpansionOfFractions/>

Research Background

In base 10 the fraction $1/3$ has 1 repeating digit, 3, while $1/7$ has 6 repeating digits: {1,4,2,8,5,7}. This demonstration shows the number of repeating digits in the base b representation of a fraction with a specified numerator and with denominators from 1 up to a specified size for bases $b = 2$ to a specified size.

Research Contribution

- Innovation – This presentation is the first time the repeating digits of fractions have been represented in this way. It is a fresh revelation of complex fractal patterns arising from the application of simple rules on simple objects.

Research Significance

The demonstration has been through a rigorous review process[†].

[†] <http://demonstrations.wolfram.com/FAQ.html>

It is expected that the fractal patterns that arise from this visualization will reveal underlying properties of numbers and provide answers to long standing mathematical problems.

A link to this demonstration can be found here:

<http://mathworld.wolfram.com/DecimalExpansion.html>

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Date: October 2009

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