

RESEARCH STATEMENT

Original Creative Work

Citation: Noel Patson 2010, Recorded or Rendered Work, Web Exhibition, *Three Touching Circles on a Line*, Wolfram Mathematica.

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

Research Background

Japanese mathematics flourished during Edo period 1603-1867 and was depicted on wooden tablets called Sangaku. One of these tablets depicted the relationship between three touching circles which share a common tangent line. The radius of the middle circle r_m is related to the radius of the left r_l and right r_r circles by this formula: $\frac{1}{\sqrt{r_m}} = \frac{1}{\sqrt{r_l}} + \frac{1}{\sqrt{r_r}}$.

The demonstration allows the user to select different sized left and right circles and calculates the radius of the middle circle. Special cases where all three circles have rational radii can be chosen. This approach is appealing to both kinaesthetic and visual learners.

Research Contribution

- Innovation – This presentation is the first time this particular Sangaku (the relationship of three touching circles with a common tangent) has been represented in this way. It is a fresh approach to presenting ancient traditional Japanese mathematics.

Research Significance

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

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

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