



AMERICAN UNIVERSITY
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THE DEPARTMENT OF MATHEMATICS AND STATISTICS COLLOQUIUM

The Fibonacci sequence, Pisot numbers and Rauzy fractals

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Abstract: Binet's formula shows how to express the Fibonacci sequence in terms of the golden mean. It is also a nice illustration of the concept of a Pisot number. Pisot numbers play a significant role in the theory of substitutions and self-similar tilings. We will show how the Pisot property leads to an important boundedness result for the Fibonacci substitution. When the same construction is applied to the related "tribonacci" substitution, the result is a curious bounded domain called the Rauzy fractal. Physicists working in the theory of quasicrystals call such a domain an "atomic surface". An atomic surface also occurs in de Bruijn's algebraic theory of Penrose tilings, but in that case it is not a fractal. The explanation involves a pair of Fibonacci sequences.

Presented by

THE AU MATH/STAT DEPARTMENT AND THE AU CHAPTER OF SIGMA XI

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