SBU Math Club Student Talk

The problem of finding all rational numbers for which the generating function of Fibonacci sequence gives integer values

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Abstract

It is known that a rational number satisfies the problem condition if and only if the number is a positive ratio of subsequent terms of the Fibonacci sequence below the golden ratio, and these ratios also happen to be convergents to the continued fraction of golden ratio. In this talk, I will discuss two solutions to the problem. I will show how to obtain a closed form of the Fibonacci sequence generating function, then a closed form of the Fibonacci sequence, as well as some results in Diophantine approximation. Finally, I will demonstrate how they can be applied to solve the problem.