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Some properties of the equation $x^2 = 5y^2 - 4$,
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Abstract

The Diophantine equation $x^2 = 5y^2 - 4$ and its three classes of solutions for automorphs will be discussed. For n an odd positive integer, any ordered pair $(x, y) = (L_{2n-1}, F_{2n-1})$ is a solution to the equation and all of the solutions are $(\pm L_{2n-1}, \pm F_{2n-1})$. We will demonstrate how to create a parameter k linking $k^3 + 3k$ to the terms x and y of such a solution (x, y) . This will produce some new identities involving the Fibonacci numbers and Lucas numbers.