On the solutions of the Diophantine equation $x^2 + 2^a \cdot p^b = y^4$

Gökhan Soydan $^1$, Huilin Zhu $^2$, Maohua Le $^3$

$^1$ Department of Mathematics, Uludağ University, Bursa 16059, Turkey
E-mail: email1@address

$^2$ School of Mathematical Sciences, Xiamen University, Xiamen 361005, P.R.China
E-mail: hlzhu@xmu.edu.cn

$^3$ Department of Mathematics, Zhanjiang Normal College, Zhanjiang 524048, P.R.China
E-mail: lemaohua2008@163.com

Abstract: Let $p$ be a fixed odd prime. In this work, a complete classification of all integer solutions $(x, y, a, b)$ of the equation $x^2 + 2^a \cdot p^b = y^4$; $\gcd(x, y) = 1$, $x > 0$, $y > 0$, $a \geq 0$, $b \geq 0$ is given, and upper bounds for the number of solutions of the equation are obtained.

Keywords and phrases: Exponential Diophantine equation, Lebesgue-Nagell equation, classification of solutions.

2010 Mathematic Subject Classification: 11D61

References


