Parity for the number of integer solutions on the curve $u^2 + v^2 = 24n + 4$ where $n \in \mathbb{Z}_{\geq 0}$

Darlison Nyirenda

The John Knopfmacher Centre for Applicable Analysis and Number Theory,
University of the Witwatersrand, P. O. Wits 2050, Johannesburg, South Africa.
e-mail: darlison.nyirenda@wits.ac.za

Abstract

For fixed $n \geq 0$, we derive an explicit formula for tha parity of the number of integer solutions $(u, v) \in \mathbb{Z}^2_{\geq 0}$ satisfying the conditions $3u^2 + v^2 = 24n + 4$ where $u \equiv 1 \pmod 2$ and $v \equiv \pm 1 \pmod 6$. Other variations are also studied.