

On Diophantine equations involving intersection of Thabit and Williams numbers base b and some ternary recurrent sequences

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Abstract. Let \mathcal{P}_n be the n -th Padovan number, E_n be the n -th Perrin number, and N_n be the n -th Narayana's cows number. Let b be a positive integer such that $b \geq 2$. In this paper, we study the Diophantine equations

$$\mathcal{P}_n = (b \pm 1) \cdot b^l \pm 1, \quad E_n = (b \pm 1) \cdot b^l \pm 1, \quad \text{and} \quad N_n = (b \pm 1) \cdot b^l \pm 1,$$

in non-negative integers n , b , and positive integer l . As a result, we determine the Padovan, Perrin and Narayana's cows numbers that are Thabit and Williams numbers base b . Moreover, we determine all solutions of the above equations within the range $2 \leq b \leq 10$.

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