On the Solutions of the Equation $x^3 + Ax = B$ in $\mathbb{Z}_3^*$ with Coefficients from $\mathbb{Q}_3$

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ABSTRACT

Recall that in [1] it is obtained the criteria solvability of the Equation $x^3 + ax = b$ in $\mathbb{Z}_p^*, \mathbb{Z}_p$ and $\mathbb{Q}_p$ for $p>3$. Since any $p$-adic number $x$ has a unique form $x = p^kx^*$, where $x^* \in \mathbb{Z}_p^*$ and $k \in \mathbb{Z}_p$ in [1] it is also shown that from the criteria in $\mathbb{Z}_p^*$ it follows the criteria in $\mathbb{Z}_p$ and $\mathbb{Q}_p$. In this paper we provide the algorithm of finding the solutions of the Equation $x^3 + ax = b$ in $\mathbb{Q}_3$ with coefficients from $\mathbb{Q}_3$.

KEYWORDS : $p$-Adic Numbers; Solvability of Equation; Congruence