THE REDUCED SMARANDACHE SQUARE-DIGITAL SUBSEQUENCE IS INFINITE

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Abstract . In this paper we prove that the reduced Smarandache square-digital subsequence is infinite.

Key words. reduced Smarandache square-digital subsequence, infinite.

Form all square integers 0,1,4,9,16,25,36,..., we choose only the terms whose digits are all perfect squares and disregarding the square numbers of the form $N \cdot 10^{2t}$, where N is also a square number and t is a positive integer. Such sequence is called the reduced Smarandache square-digital subsequence . Bencze [1] and Smith [2] independently proposed the following question.

Question . How many terms in the reduced Smarandache square-digital subsequence?

In this paper we completely solve the mentioned question . We prove the following result.

Theorem . The reduced Smarandache square-digital subsequence has infinitely many terms.

By our theorem , we can give the following corollary immediately .

Corollary . The reduced Smarandache square-partial-digital subsequence has infinitely many terms.

Proof of Theorem . For any positive integer n , let

(1) $$A(n)=2.10^n+1.$$

Then we have

(2) $(A(n))2 = 4.102^n + 4.10^n + 1 = 4\underbrace{0 \cdots 0}_{(n\text{-}1)\text{zeros}} 4 \underbrace{0 \cdots 0}_{(n\text{-}1)\text{zeros}} 1$.

By (1) and (2), we see that $(A(n))^2$ belongs to the reduced Smarandache square—digital sudsequence for any n hus, the sequence has infinitely many terms The theorem is proved.

References

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