

# PERFECT POWERS IN THE SMARANDACHE PERMUTATION SEQUENCE

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**Abstract.** In this paper we prove that the Smarandache permutation sequence does not contain perfect powers.

Let  $S = \{S_n\}_{n=1}^{\infty}$  be the Smarandache permutation sequence. Then we have

$$(1) \quad s_1 = 12, \quad s_2 = 1342, \quad s_3 = 135642, \quad s_4 = 13578642, \dots$$

In [1, Notion 6], Dumitrescu and Seleacu posed the following question:

Question . Is there any perfect power belonging to  $S$ ?

In this respect, Smarandache [2] conjectured: no! In this paper we verify the above conjecture as follows:

**Theorem.** The sequence  $S$  does not contain powers.

**Proof.** Let  $s_n$  be a perfect power. Since  $2 \mid s_n$  by (1), then we have

$$(2) \quad 4 \mid s_n.$$

Since  $s_1 = 12$  is not a perfect power, we get  $n > 1$ . Then

from (1) we get

$$(3) \quad s_n = 10^2 a + 42,$$

where  $a$  is a positive integer. Notice that  $4 \mid 10^2$  and  $4 \nmid 42$ . We find from (3) that  $4 \nmid s_n$ , which contradicts (2). Thus, the theorem is proved.

#### References

1. Dumitrescu and Seleacu, Some Notions and Questions In Number Theory, Erhus Univ. Press, Glendale, 1994.
2. F.Smarandache, Only Problems, not Solutions! Xiquan Pub. House, Phoenix, Chicago, 1990.