On a Conjecture of F. Smarandache

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Abstract: The main purpose of this paper is to solve a problem generated by Professor F. Smarandache.

Key word: Permutation sequence; k-power.

Let n be a positive integer, n is called a k-power if n=m^k, where k and m are positive integer, and k≥2. Obviously, if n is a k-power, p is a prime, then we have p|n, if p|n.

In his book "Only Problems, not Solutions", Professor F. Smarandache defined a permutation sequence: 12, 1342, 13578642, 13579108642, 135791112108642, 1357911131412108642, 13579111315161412108642, 135791113151718161412108642,..., and generated a conjecture: there is no any k-power among these numbers. The main purpose of this paper is to prove that this conjecture is true.

Suppose there is a k-power a(n) among the permutation sequence. Noting the fact: 12=2²×3, we may immediately get: a(n)≥1342>10000. For the last two digits of a(n) is 42, so we have a(n)≡42(mod100)

Noting that 4|100, we may immediately deduce: a(n)≡42≡2(mod4).

So we get 2|a(n), 4|a(n). However, 2 is a prime, then 4|a(n) contradicts with 4|a(n). So a(n) is not a k-power.

This complete the proof of the conjecture.

REFERENCES