

## Even and odd nature for Pseudo $\tau$ -adic Non-Adjacent form

### ABSTRACT

An algorithm was developed by previous researcher for elliptic scalar multiplication (SM) on Koblitz curve where the multiplier of SM is in the form of Pseudo  $\tau$ -adic Non-Adjacent (pseudoTNAF). PseudoTNAF of an element of the ring  $Z$  where  $\tau$  is an expansion where the digits are generated by successively dividing by  $\tau$ , allowing remainders of  $0$  or  $1$ . Such a multiplier is in the form of  $\sum_{i=0}^{n-1} d_i \tau^i$ . In this paper, we refine some properties of the multiplier from previous researchers focusing on even and odd situation for  $\tau$  and  $n$ . We also propose two properties of  $\tau$  when  $n$  is even and  $n$  is odd. As a result, the nature of  $\tau$  and  $n$  are depends on the nature of  $\tau$  and  $n$  when  $n$  is even. Whereas, the nature of  $\tau$  and  $n$  are not depends on the nature of  $\tau$  and  $n$  when  $n$  is odd.

**Keyword:** Pseudo  $\tau$ -adic Non-Adjacent Form (pseudoTNAF); Scalar multiplication (SM); Koblitz curve