Review of: "Additive and Multiplicative Operations on Set of Polygonal Numbers"

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Potential competing interests: No potential competing interests to declare.

I have observed the following points

1. **The formula for *n*-th *k*-gonal number lacks novelty.**

This paper presents an alternate formulation for the generation of *n*-th *k*-gonal numbers, which is

$$P(k,n) = \frac{n}{2}[(k-3)(n-1)+(n+1)]$$

There is not much novelty in this formula. This formula is a direct rearrangement of terms of the formula available in the literature. Please see the below

$$P(k,n) = (k-2)\frac{n(n-1)}{2} + n = \frac{n}{2}[(k-2)(n-1)+2] = \frac{n}{2}[(k-3)(n-1)+(n+1)]$$

2. **The iterative computation is costlier than the direct computation**

The formula is sufficient for generating *k*-gonal numbers with complexity $O(\log k (\log n)^2)$. There is no need to use the recursive formula. I compute the complexity of the iterative computation

$$(\; +1, \;) = (\; , \;) + \; ,$$

where T_n is the *n*-th triangular number given as $\; = \frac{(\; -1)}{2}$.

Let the computation required to compute $P(k,n)$ be $t_{k,n}$. $\frac{(\; -1)}{2}$ can be computed roughly in $(\log \;)^2$ operations.

Therefore, we have,

$$_{+1,} \; = \; _{,} \; + (\log \;)^2$$

Iterating this recurrence, we get

$$_{,} \; = O(\; (\log \;)^2).$$

Thus, iteration is costlier than the direct computation.

3. The significance of (,) for negative is not given in the submission.

In view of the above, I conclude that the work lacks novelty, contribution, motivation, and usefulness. The tables given are for small numbers. Much larger tables may be generated from software programs within seconds.