

Referee's report on

Constructing segments of quadratic length in $\text{Spec}(T_n)$ through segments of linear length

In the paper under review, the spectrum of the Transposition graph T_n is studied. The author proves that for every $n \geq 31$ all integers from the segment $[-n, n]$ lie in the spectrum of T_n . The author also shows that a segment of length $O(n^2)$ lies in the spectrum of T_n . These results improve previous results on this topic. I recommend the paper for publication after minor revision.

Remarks:

1. The notation C_n^k for binomial coefficients is very rarely used in research papers. I recommend to use the standard notation $\binom{n}{k}$ instead of C_n^k (in all places).
2. Page 1, Line -2. It is follows from \longrightarrow It follows from
3. Page 2, Line 2. The conjugate of partition $p \longrightarrow$ The conjugate of a partition p
4. Page 3, Two sentences before Theorem 4. I suggest to define y_1 and y_2 before Theorem 4.
5. Page 3, The first sentence of Section 2. I think "further" is extra.
6. Several times you use "partition p holds" or " p holds". What does it mean? I suggest to use "exists" instead of "holds".
7. Page 12. I recommend to rotate Table 4.