PROBLEMS COLUMN

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CLIQUE PARTS INDEPENDENT OF REMAINDERS

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Let p and t stand for positive integers. Let R denote an edge subset of size $|R| = {p \choose 2} \mod t$ in the complete graph K_p . Call R a remainder (or an edge *t*-remainder) in the clique K_p .

Conjecture L (L reminds of floor symbol). The floor class $\lfloor K_p/t \rfloor$ is nonempty. In other words, there exists a graph F such that, for each edge *t*-remainder R in K_p , F is a *t*th part of $K_p - R$, i.e., $F \in \lfloor K_p/t \rfloor$.

Conjecture L implies the following conjecture stated in [2].

Conjecture L*. For each edge *t*-remainder R in K_p , there is an $F_R \in (K_p - R)/t =: \lfloor K_p/t \rfloor_R$.

Theorem L' (Skupień [2]). There exists an edge t-remainder R in K_p such that the floor class $\lfloor K_p/t \rfloor_R$ is nonempty.

Plantholt's theorem [1] on chromatic index is equivalent to the truth of Conjecture L with t = p - 1 and p being odd.

Conjecture L can be seen true for many pairs p, t, e.g., if $t \ge p-1$ or t is small: $t \le 5$. If t is a constant $(t \ge 4)$, both Conjectures can be reduced to some values of p in the interval $t + 2 \le p \le 4t - 5$.

References

- M. Plantholt, The chromatic index of graphs with a spanning star, J. Graph Theory 5 (1981) 45–53.
- [2] Z. Skupień, The complete graph t-packings and t-coverings, Graphs Combin. 9 (1993) 353-363.

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