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Planar Turán number of the 6*-Cycle.*

Let $\mathrm{ex}_{\mathcal{P}}(n, T, H)$ denote the maximum number of copies of T in an n-vertex planar graph which does not contain H as a subgraph. When $T = K_2$, $\mathrm{ex}_{\mathcal{P}}(n, T, H)$ is the well studied function, the planar Turán number of H, denoted by $\mathrm{ex}_{\mathcal{P}}(n, H)$. The topic of extremal planar graphs was initiated by Dowden (2016). He obtained sharp upper bound for both $\mathrm{ex}_{\mathcal{P}}(n, C_4)$ and $\mathrm{ex}_{\mathcal{P}}(n, C_5)$. Later on, Y. Lan, et al. continued this topic and proved that $\mathrm{ex}_{\mathcal{P}}(n, C_6) \leq \frac{18(n-2)}{7}$. In this paper, we give a sharp upper bound $\mathrm{ex}_{\mathcal{P}}(n, C_6) \leq \frac{5}{2}n - 7$, for all $n \geq 18$, which improves Lan's result. We also pose a conjecture on $\mathrm{ex}_{\mathcal{P}}(n, C_k)$, for $k \geq 7$. (Received August 10, 2020)