

On a Packing Problem of Alon and Yuster

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Two graphs G_1 and G_2 , each on n vertices, *pack* if there exists a bijection f from $V(G_1)$ onto $V(G_2)$ such that $uv \in E(G_1)$ only if $f(u)f(v) \notin E(G_2)$. In 2014, Alon and Yuster proved that, for sufficiently large n , if $|E(G_1)| < n - \delta(G_2)$ and $\Delta(G_2) \leq \sqrt{n}/200$, then G_1 and G_2 pack. Recently, we characterized the pairs of graphs for which the theorem of Alon and Yuster is sharp. We also prove the stronger result that for sufficiently large n , if $|E(G_1)| \leq n$, and $\Delta(G_2) \leq \sqrt{n}/60$, and $\Delta(G_1) + \delta(G_2) \leq n - 1$, then G_1 and G_2 pack whenever there is a vertex $v_1 \in V(G_1)$ such that $d(v_1) = \Delta(G_1)$ and $\alpha(G_1 - N[v_1]) \geq \delta(G_2)$.