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Problem 13

Problem 14

For $0 < l < m \leq d$, we will construct a graph $F(d, l, m)$ with

- $\delta(F(d, l, m)) = d$
- $\kappa(F(d, l, m)) = l$
- $\kappa'(F(d, l, m)) = m$

Let $F'(l, m) := K_{l,m}$ be the complete bipartite graph of l, m partition sizes. Thus,

$$\kappa(F'(l, m)) = \kappa(K_{l,m}) = \min\{l, m\} = l \tag{1}$$

and furthermore,

$$\kappa'(F'(l, m)) = \kappa'(K_{l,m}) = \max\{l, m\} = m \tag{2}$$

.

Now, we construct $F(d, l, m)$ by substituting each vertex of $F'(l, m)$ with the complete graph K_d. Hence, $\delta(F(d, l, m)) = d$. Since $\kappa(K_d) = d \geq m$ and $\kappa'(K_d) > l$ and since we do not modify the connections between those substituted vertices, the edge- and vertex-connectivity of $F'(l, m)$ are maintained in $F(d, l, m)$.

Problem 15

Problem 16