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FEEDBACK VERTEX SETS IN (DIRECTED) GRAPHS OF BOUNDED DEGENERACY OR TREewidth

We study the minimum size f of a feedback vertex set in directed and undirected n -vertex graphs of given degeneracy or treewidth. In the undirected setting the bound $\frac{k-1}{k+1}n$ is known to be tight for graphs with bounded treewidth k or bounded odd degeneracy k . We show that neither of the easy upper and lower bounds $\frac{k-1}{k+1}n$ and $\frac{k}{k+2}n$ can be exact for the case of even degeneracy. More precisely, for even degeneracy k we prove that $f < \frac{k}{k+2}n$ and that there exists a graph with $f \geq \frac{3k-2}{3k+4}n$.

For directed graphs of bounded degeneracy k , we prove that $f \leq \frac{k-1}{k+1}n$ and that this inequality is strict when k is odd. For directed graphs of bounded treewidth $k \geq 2$, we show that $f \leq \frac{k}{k+3}n$ and that there exists a graph with $f \geq \frac{k-2\lfloor \log_2(k) \rfloor}{k+1}n$. Further, we provide several constructions of low degeneracy or treewidth and large f .

This is a joint work with Kolja Knauer, and Petru Valicov.