HEIN VAN DER HOLST, Georgia State University
Digraphs with maximum stable nullity at most 1

For a digraph D with vertex-set $V = \{1, \ldots, n\}$ and arc-set A, let $Q(D)$ be the set of all real $n \times n$ matrices $A = [a_{i,j}]$ with $a_{i,j} \neq 0$ if $ij \in A$, $a_{i,i} \neq 0$ for $i \in V$, and $a_{i,j} = 0$ if $i \neq j$ and $ij \notin A$. We say that a matrix $A \in Q(D)$ satisfies the ASAP if for all $A \circ X = 0$, $AX^T = 0$ and $X^T A = 0$ implies $X = 0$. The stable maximum nullity $Ms(D)$ of a digraph D is the maximum nullity of any $A \in Q(D)$ satisfying the ASAP. A digraph D has $M_s(D) = 0$ if and only if D has no directed cycles. If D is a digraph, we denote by $\overleftarrow{D}$ the digraph obtained from D by reversing each arrow. In this talk, we show that the digraphs D with $M_s(D) \leq 1$ are exactly the digraphs D such that D and $\overleftarrow{D}$ have Kelly-width ≤ 1 .