
LUCAS MOL, Dalhousie University

Shape and roots of the node reliability polynomial

Consider a network G in which each node operates independently with probability $p \in (0, 1)$. The *node reliability polynomial* of G is the probability that the operational nodes can all communicate in the induced subgraph that they generate. We investigate the shape and roots of the node reliability polynomial, and compare our findings to those for all-terminal reliability. While the all-terminal reliability polynomial of any connected graph is increasing on $(0, 1)$, we prove that the node reliability polynomial of any sparse graph of sufficiently large order has an interval of decrease. We present several families of graphs with real, positive node reliability roots that tend to infinity. This differs greatly from the situation for all-terminal reliability polynomials, where it is conjectured that all roots are bounded. This is joint work with Jason Brown.