John Estes, William Staton, and Bing Wei
Independent Sets of Cardinality s of Maximal Outerplanar Graphs,
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Abstract

In 1982, Prodinger and Tichy defined the Fibonacci number $f(G)$ to be the number of independent sets in the graph G. Let $\alpha(G)$ be the cardinality of a maximum independent set of G and $f_s = f_s(G)$ be the number of independent sets of cardinality s in G. Then the independence polynomial of G is defined to be $I(G;x) = \sum_{s=0}^{\alpha(G)} f_s(G)x^s$, and so $I(G;1) = f(G)$. In 1998, Alameddine determined that $f(P_n^2) \leq f(G) \leq f(S_n^2)$ for maximal outerplanar graphs G with equality reached uniquely by the 2-path P_n^2 and the 2-spiral S_n^2, respectively. We will investigate $f(G)$ for maximal outerplanar graphs by way of the coefficients f_s of $I(G;x)$; we show that for a maximal outerplanar graph G and $s \geq 3$, $\binom{n+2-2s}{s} \leq f_s(G) \leq \binom{n-s}{s}$. The lower bound is uniquely reached by P_n^2, and the upper bound is reached exclusively by D_6^2 and S_n^2. As a corollary, we show the works of Alameddine with one more graph obtaining the upper bound when $n = 6$.