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Roots of the Independence Polynomial of Paths and Cycles

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This is a joint work with Y. Peng.

The independence polynomial of a graph G is the polynomial $\sum i_k x^k$, where i_k denote the number of independent sets of cardinality k in G . In this paper, we find all roots of the independence polynomial of path P_n and cycle C_n . As a consequence, the roots of each of the family $\{P_n\}$ and $\{C_n\}$ are real and dense in $(-\infty, -\frac{1}{4}]$. Our approach is by finding the roots of Jacobsthal polynomial and then establishing the relationship between this polynomial and the independence polynomial of paths and cycles.