Conde, J.; Gimbert, J.; González, J.; Miller, M.; Miret, J. M.
On the nonexistence of almost Moore digraphs. (English) Zbl 1284.05113

Summary: Digraphs of maximum out-degree at most \( d > 1 \), diameter at most \( k > 1 \) and order \( N(d, k) = d + \cdots + d^k \) are called almost Moore or \((d, k)\)-digraphs. So far, the problem of their existence has been solved only when \( d = 2, 3 \) or \( k = 2, 3, 4 \). In this paper we derive the nonexistence of \((d, k)\)-digraphs, with \( k > 4 \) and \( d > 3 \), under the assumption of a conjecture related to the factorization of the polynomials \( \Phi_n(1 + x + \cdots + x^k) \), where \( \Phi_n(x) \) denotes the \( n \)th cyclotomic polynomial and \( 1 < n \leq N(d, k) \). Moreover, we prove that almost Moore digraphs do not exist for the particular cases when \( k = 5 \) and \( d = 4, 5 \) or 6.

MSC:
05C20 Directed graphs (digraphs), tournaments
05C35 Extremal problems in graph theory

Keywords:
\((d, k)\)-digraphs

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References:


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