

Zyta Dziechcińska-Halamoda, Zofia Majcher, Jerzy Michael, Zdzisław Skupień

## LARGE MINIMAL IRREGULAR DIGRAPHS

**Abstract.** A digraph is called irregular if its distinct vertices have distinct degree pairs. An irregular digraph is called minimal if the removal of any arc results in a non-irregular digraph. A large minimal irregular digraph  $F_n$  of order  $n$  is constructed if  $n$  is the sum of initial positive integers. It is easily seen that the minimum and maximum sizes among  $n$ -vertex irregular digraphs are asymptotic to  $\frac{\sqrt{2}}{3}n^{3/2}$  and  $n^2$ , respectively. It appears that the size of  $F_n$  is asymptotic to  $n^2$ , too. Similarly, a minimal irregular oriented graph  $H_n$  is constructed such that the size of  $H_n$  is asymptotic to  $\frac{1}{2}n^2$  whence it is asymptotically the largest size among  $n$ -vertex oriented graphs whether irregular or not.

**Keywords:** digraph, irregular digraph, oriented graph, minimal.

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