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**Aleksandr Kodess\*** (kodess@uri.edu), University of Rhode Island, 5 Lippitt Road, Lippitt Hall, room 200, Kingston, RI 02881. *Algebraic Digraphs*.

Let  $q$  be a prime power,  $\mathbb{F}_q$  denote the finite field of  $q$  elements. Let  $f_i: \mathbb{F}_q^2 \rightarrow \mathbb{F}_q$  be arbitrary functions,  $1 \leq i \leq l$ . The digraph  $D = D(q; \mathbf{f})$ , where  $\mathbf{f} = (f_1, \dots, f_l): \mathbb{F}_q^2 \rightarrow \mathbb{F}_q^l$ , is defined as follows. The vertex set  $V$  of  $D$  is  $\mathbb{F}_q^{l+1}$ . There is an arc from  $(x_1, \dots, x_{l+1}) \in V$  to  $(y_1, \dots, y_{l+1}) \in V$  if and only if  $x_i + y_i = f_{i-1}(x_1, y_1)$  for all  $i$ ,  $2 \leq i \leq l+1$ .

When  $l = 1$  and  $f = f_1$  can be represented by the polynomial  $X_1^m X_2^n$ , the digraph  $D = D(q; m, n)$  is called a *monomial* digraph. The digraphs  $D(q; \mathbf{f})$  and  $D(q; m, n)$  are directed analogues of a well studied class of algebraically defined undirected bipartite graphs  $B\Gamma(q; f)$  having many applications, most noticeably in extremal graph theory supplying a lower bound of the best magnitude on some  $\text{ex}(\nu, C_{2l})$ .

We present a number of results on the strong connectivity of the general algebraic digraph  $D(q; \mathbf{f})$  and the diameters of monomial digraphs. We also discuss the isomorphism problem for all monomial digraphs for a fixed  $q$ . (Received August 16, 2016)