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On a class of functions in finite algebras

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Abstract. Given an n-ary $k-$valued function f, $gap(f)$ denotes the minimal number of essential variables in f which become fictive when identifying any two distinct essential variables in f. It is called the essential arity gap of f. We obtain an explicit determination of the class $G^n_{p,k}$ of all n-ary $k-$valued functions f whose essential arity gap is equal to p, $p \leq n \leq k$. Our methods yield new combinatorial results about the number of $k-$valued functions with given gap.
Given a function f, the essential variables in f are defined as variables which occur in f and weigh with the values of that function. The number of essential variables is an important measure of complexity for discrete functions. We proved a few results concerning simplifying of functions by identification of variables.

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