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The minimal faithful dimension of finite p -groups: an application of the orbit method to the essential dimension

For a finite group G and a field K , the faithful dimension of G over K is defined as the smallest possible dimension of a faithful K -representation of G . By a result of Karpenko and Merkurjev, if G is a p -group and K contains a primitive p -th root of unity, then the faithful dimension of G is equal to the essential dimension of G over K , a notion introduced by Buhler and Reichstein. We use the orbit method to obtain qualitative and quantitative results on the faithful dimension of G for a wide range of examples. This is joint work with M. Bardestani and K. M. Karai.