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Automorphism groups of rational circulant graphs. Preliminary report.

A Cayley graph Γ over the cyclic group Z_n of order n is called a rational n -vertex circulant graph if the spectrum of its adjacency matrix is rational. Using theory of Schur rings we describe an efficient recursive procedure which for a given graph Γ returns description of the automorphism group $Aut(\Gamma)$. This description is based on the classification of all rational S-rings over Z_n (S-rings of traces in a sense of Schur - Wielandt), which was obtained by Muzychuk (1993), as well as on a certain generalization of the operation of wreath product of permutation groups, namely on a particular case of recently introduced by Bailey - Cameron crested product. Initial operands are symmetric groups of suitable degrees. Special attention is payed to the consideration of those cases when the resulted group may be described only in terms of direct and wreath products. (Jointly with I.Kovacs.) (Received August 29, 2006)