

Algebra/Topology Seminar

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REGULAR PERMUTATION GROUPS OF ORDER mp AND HOPF GALOIS STRUCTURES

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1:15 p.m. in ES-143

ABSTRACT. Let Γ be a group of order mp where p is prime and $p > m$. We give a strategy to enumerate the regular subgroups of $Perm(\Gamma)$ normalized by the left regular representation $\lambda(\Gamma)$ of Γ . These regular subgroups are in one-to-one correspondence with the Hopf Galois structures on Galois field extensions L/K with $\Gamma = Gal(L/K)$. We prove that every such regular subgroup is contained in the normalizer in $Perm(\Gamma)$ of the p -Sylow subgroup of $\lambda(\Gamma)$. This normalizer has an affine representation that makes feasible the explicit determination of regular subgroups in many cases. We illustrate our approach with some examples, including the case of groups of order $p(p-1)$ where p is a “safe prime”, previously studied by Lindsay Childs.