

Alexander invariants and cohomology jump loci in group extensions

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Abstract. We study the integral, rational, and modular Alexander invariants, as well as the cohomology jump loci of groups arising as extensions with trivial algebraic monodromy. Our focus is on extensions of the form $1 \rightarrow K \rightarrow G \rightarrow Q \rightarrow 1$, where Q is an Abelian group acting trivially on $H_1(K; \mathbb{Z})$, with suitable modifications in the rational and mod- p settings. We find a tight relationship between the Alexander invariants, the characteristic varieties, and the resonance varieties of the groups K and G . This leads to an inequality between the respective Chen ranks, which becomes an equality in degrees greater than 1 for split extensions.

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