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Mathematics > Group Theory

The space of bi-invariant orders on a nilpotent group

Dave Witte Morris

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We prove a few basic facts about the space of bi-invariant (or left-invariant) total order relations on a torsion-free, nonabelian, nilpotent group G. For instance, we show that the space of bi-invariant orders has no isolated points (so it is a Cantor set if G is countable), and give examples to show that the outer automorphism group of G does not always act faithfully on this space. Also, it is not difficult to see that the abstract commensurator group of G has a natural action on the space of left-invariant orders, and we show that this action is faithful. These results are related to recent work of T.Koberda that shows the automorphism group of G acts faithfully on this space.

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