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Ordering groups and the Identity Problem.

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Abstract:

To order a group means to find a total ordering of its elements that is invariant under (right, or left) multiplication.

In this talk I will explore in which groups and situations a partial order can be extended to a total order. For example, in nilpotent groups the question about extending partial to total orders is connected to the Identity Problem: this asks if the subsemigroup generated by a given finite set of group elements contains the identity element of the group. I will explain the connections between orderability, the Identity Problem, and the Word Problem in lattice-ordered groups, and present instances where these problems are decidable.

Joint work with Corentin Bodart and George Metcalfe.