

Cone Types, Automata and Regular Partitions in Coxeter Groups

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Coxeter groups were famously proven to be automatic by Brink and Howlett in 1993 and the automaticity of these groups has been an area of continued interest since. In this talk, we give a brief history and summary of recent developments in this area, and we introduce the theory of regular partitions of Coxeter groups. We show that regular partitions are essentially equivalent to the class of automata (not necessarily finite state) recognising the language of reduced words in the Coxeter group. As an application of this theory we prove that each cone type in a Coxeter group has a unique minimal length representative. This result can be seen as an analogue of Shi's classical result that each component of the Shi arrangement of an affine Coxeter group has a unique minimal length element. This work is joint with James Parkinson.

(joint work with James Parkinson)