Groups and symmetries: From the Neolithic Scots to John McKay
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Finiteness of the number of arithmetic groups generated by reflections in hyperbolic spaces

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Abstract

In 1980, 1981, the speaker proved that the number of maximal arithmetic reflection groups is finite in hyperbolic space of each fixed dimension $n \geq 10$. In 1981, Vinberg proved that such groups don't exist in dimension $n \geq 30$. During 25 years, there were no new general results in this domain.

In 2005, Long, Maclachlan and Reid proved finiteness in dimension $n = 2$, and Agol proved finiteness in dimension $n = 3$.

In 2006, math.AG/0609256, the speaker proved finiteness in all remaining dimensions $4 \leq n \leq 9$. Thus, finally, the proof of the finiteness is completed in hyperbolic spaces all together.

In my talk, I hope to review these old and new results.