

Hilbert's Seventh Problem

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September 30, 2016 - 10:00 - Room 2AB40

Abstract

The aim of this seminar is to discuss the Seventh Problem posed by David Hilbert at the beginning of the twentieth century about the irrationality and transcendence of certain numbers, that can be stated as: is a^b always transcendental, for algebraic $a \notin \{0, 1\}$ and irrational algebraic b ? Firstly we will see its equivalent formulations and how several mathematicians partially solved it for particular numbers. Then we will examine the proof of the complete solution given by Alexander Gelfond in 1934 and how it is connected to other problems in transcendental number theory.

References

- [1] R. Tubbs, *Hilbert's Seventh Problem*, lecture notes, 2011
- [2] M. Filaseta, *Transcendental Number Theory*, lecture notes, <http://people.math.sc.edu/filaseta/gradcourses/Math785/notes785.html>
- [3] N. I. Feldman, Y. V. Nesterenko, A. N. Parshin, I. R. Shafarevich, *Number Theory IV: Transcendental Numbers*, Springer, 1998