Universität Konstanz

Algebra Berichtseminar

organized by Dr. Maria Infusino and Prof. Dr. Salma Kuhlmann

Independence in set theory

Jakob Everling

July 8th, 2020 – 15.15 – 16.45 in video-conference at:
https://uni-konstanz.webex.com/uni-konstanz/j.php?MTID=md41d952101fb5259c2477a770447c189

In the early 20th century, one of the central quests of mathematics was finding a formalism for mathematics that was provably consistent and complete. However, Kurt Gödel showed in 1930 that this was impossible, and that any useful formal system for mathematics had to be at least incomplete: There must be statements that can neither be proved nor disproved. In this talk, we show some examples of such statements that are relevant to algebra and analysis. We introduce the logic necessary to conclude independence by building models. We show Gödel's construction of the constructible hierarchy to establish the consistency of ZFC + CH. Finally, we introduce Cohen's technique of Forcing to construct a model of ZFC without CH, establishing the independence of the Continuum Hypothesis.

Bibliography

[1] H.G. Dales and W.H. Woodin, *An Introduction to Independence for Analysts*, Cambridge University Press, 1987.

[2] T. Jech, *Set Theory*, Pure and Applied Mathematics, 79, Academic Press, New York, 1978.

[3] K. Kunen, *Set Theory*, Studies in Logic, 34, College Publications, London, 2011.