

# Qualification Examination in Theory

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## Sources and Acknowledgments

I received Markov's "Insolubility of the Problem of Homeomorphy" [Mar60] in original Russian from Prof. Edelsbrunner. He also gave me a German translation of the article by Rolf Herken. I concluded after researching the area that the paper had never been translated into English. As part of my research, I contacted Grzegorz Rozenberg via email and he directed me to contact additional people. I corresponded with Volker Diekert, Sergei Mateev, Andrei Voronkov, and Geraud Senizergues. The last two people provided me with important leads into researching the subject of this paper.

I translated the article by scanning it, using Omni Pro 7.0's OCR capability, and utilizing the demonstration of a translation software product on the web [GMS96]. I used my knowledge of German to rewrite the sentences and Prof. Edelsbrunner reviewed my translation.

By far, the most useful papers were [Mat86] and [AM86] which discuss the Markov and Novikov schools respectively. I got my definition of associative and inversive calculi from Markov's Invariants paper [Mar62]. An important paper would have been Adyan's original proof of undecidability of group isomorphism [Ady55], but I don't believe it is available in English. In its place, one may use Rabin's independent proof [Rab58]. Novikov's proof of the undecidability of the word problem in groups [Nov58] is long, but readable and complete. A good source for Markov Algorithms is his book [Mar61].

I also used Mathematical Reviews extensively, both in paper and on-line form [Mat98].

My understanding of Algebraic Topology is mainly from chapters 2 through 4 of Massey's very readable book [Mas91] as well as chapter 7 of Seifert and Threlfall's topology book [ST80]. My definition of groups is from [LR90] and I used [Hen79] for basic definitions which were often lacking from the other sources.

My treatment of the history of undecidability is based on Matiyasevich's [Mat86] and I used online sources [Sch96] and [Joy98] for additional information and Hilbert's picture and speech. [Dav65] has all the original papers in Undecidability, including Post's proof of the undecidability of the word problem for Semi-groups. The examples of Thue's problem are from [Joh94]. Markov's picture is from [Log84].

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