

This work deals with intuitionistic logic and completeness of Gentzen calculus with respect to its semantics. The completeness proof uses saturated sequents. The language considered is at most countable. Furthermore, our work investigates one of the generalizations of intuitionistic logic, namely intuitionistic logic with constant domain, or Grzegorzczuk's logic. We deal with Markov's principle and use it to prove that Gentzen calculus adapted to this logic is not cut-free complete with respect to Grzegorzczuk's logic. Part of the work deals with Heyting algebras—one of the possible semantics of intuitionistic propositional logic. We show that the Rieger-Nishimura lattice is a Heyting algebra, too. For Heyting algebras, filters and prime filters are defined and used to obtain Kripke's frames. It is shown that the same formulas hold in these frames and in Heyting algebras.