Description for the General Public

Applications of non-classical logics of different sort in computer science, cognitive science, artificial intelligence and other areas are common nowadays. One cannot even imagine today's life without using various devices which are strongly based on theoretical solutions developed in the framework of various nonclassical logics. Some of them, like modal logics or higher order logics, simply extend classical logic, whereas other, like linear logic, fuzzy, or relevant logics, modify significantly its properties. In particular, modal logics deserve special attention due to their usefulness. The aim of the project is the investigation of some important proof systems for nonclassical logics. We will focus on sequent and tableau calculi in standard and generalised form, and their application to widely understood modal logics. Both sequent and tableau calculi are one of the most interesting proof systems applied in proof theoretical research and in automated deduction. Modal logics form a wide class of important extensions of classical logics which are extensively applied to formalize temporal, epistemic, deontic and many other notions. In particular we are going:

1. To develop some new proof systems and compare their behaviour with other known solutions. In particular, we focus on the generalised version of sequent calculus called hypersequent calculus and on labelled tableau systems.

2. To study different methods of proving essential features of sequent and tableau calculi which facilitate actual practice of proof. These include methods of proving admissibility of cut rule and termination of proof search.