

Classical logics, such as first-order logic, can be seen as approaches which are mainly concerned with a formalization of universal truths. In such a logic, whenever a formula ϕ is a logical consequence of a set of axioms Σ , then it remains true for all time and without exception even if we add new axioms to Σ . Without doubt such a kind of monotonic reasoning perfectly fits together with the purpose or self-image of mathematics but it is inadequate to model commonsense reasoning. In daily life we are often faced with incomplete knowledge. Nevertheless, we want or have to draw conclusions. In such a situation we typically assume that the world behaves as expected. Consequently, we conclude what is normally true as long as there is no evidence to the contrary. If we later learn that the drawn conclusion is not justified since the normality assumption is invalidated we have to withdraw it. The realization that classical logic is not suitable to model such defeasible reasoning was the main reason for the increasing interest in nonmonotonic logics within the Artificial Intelligence (AI) community in the late 1970s.

At the end of the 1980s the novel idea of using argumentation to model nonmonotonic reasoning emerged in AI. The new way to model defeasible inference can be summarized as follows: building arguments based on the existence of proofs in a certain underlying logic, identifying conflicts between them and then determining acceptable sets of arguments which finally justifies a certain decision or conclusion. One piece of work which was highly influential in turning argumentation theory into the popular and vibrant research area it is today was the landmark paper of Phan Minh in 1995. Dung's abstract argumentation frameworks (AFs) treat arguments and attacks between them as undefined primitives. The major focus is on resolving conflicts. To this end a variety of semantics have been defined, each of which captures different intuitions about how to reason about conflicting knowledge. Although, Dung-style AFs are among the simplest argumentation systems one can think of, this approach is still powerful. For example, it has been shown how to reconstruct some mainstream nonmonotonic formalisms as special forms. Dung himself provided such a correspondence for default logic and defeasible logic.

In the subsequent years further correspondences between existing nonmonotonic formalisms and abstract argumentation theory were shown. Other research lines in abstract argumentation are the introduction of new semantics as well as defining suitable extensions of Dung's theory. The motivations of the newly invented semantics range from the desired treatment of specific examples to fulfilling a number of abstract principles. The further developments of Dung's theory encompass attacks on attacks, collective attacks as well as the addition of preferences or values to arguments in order to judge the success of an attack.

The investigation of metalogical properties like cardinality results, monotonicity results, splitting results and replacement theorems has begun only recently and is still at the beginning. This research field is the main subject of this thesis.