

# Nonmonotonic Reasoning and Self Reference

## 1. Introduction

During the last decade many major approaches to nonmonotonic reasoning have been developed. The underlying motivation of each of these approaches is a framework which allows more inferences to be drawn than it is deductively possible. Although these approaches look so different in terms of motivation and in their formal machinery, they all seem to have one factor in common: the employment, whether implicit or explicit, in some way or another a term like "inability to infer" or "cannot infer" or "fail to derive" within the inference mechanism of the system. Nonmonotonicity then comes about from the fact that after increasing the amount of information available as premises, some of the conclusions that can be drawn before are no longer derivable. As then what could or could not be inferred initially would have to change in the light of the new information.

In this paper we shall make an attempt at capturing such form of reasoning in a way that seems more natural than any of the other approaches. Although these approaches have based their accounts on some variation of a term like "cannot infer", they have not made the attempt to encode it in the language of the resulting system. Instead, they emphasized the interpretation of the "modal operator" or the "rule" which in some way captures or employs the term, forgetting the main motivation.

On the other hand, encoding a term like "cannot infer" in the language of a logical system (whose inference notion is being encoded) results in an added complexity, namely self-referentiality. Some of the logicians and researchers who are interested in "semantic paradoxes" [via personal communication] tend to believe that the two issues (logics of "truth" and nonmonotonic logics) are orthogonal. However, they do seem to agree that the revision processes employed in some theories of truth bear some similarities to those used in some approaches to nonmonotonic reasoning. We shall, in this paper, make an attempt to bring forward some of these similarities and discuss whether logics of truth and nonmonotonic

