Logics for OO information systems: a semantic study of object orientation from a categorial substructural perspective

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The modern languages for information systems talk about complex objects. These objects have identity and can have a complex signature, and can be subject to complex constraints. In order reach the expressiveness needed to specify the behavior of an object, we need to be able to talk about the whole object and about partial descriptions of a complex object. Preferably we should be able to talk about objects taken together and also have the ability to count objects.

Although it seems quite natural to combine sentences that say things about an aspect of an object and sentences that say things about the whole object, this combination raises some difficult questions. The questions involve the way we interpret the language constructors that combine propositions on the whole object and propositions on its aspects. We will argue that these questions arise from problems involved with dealing with the notion of identity when speaking about parts of the world. These problems are well known in philosophy and have proven to be far from trivial. Therefore it is only natural we encounter these problems when formalizing the languages of information systems that talk about parts of the world.

In this part of the thesis we discuss philosophical issues of modeling information systems and the object oriented concepts. If effect we take a step back from the conceptual world we sketched out in the previous chapters and concentrate separately on some core notions that are important in the field of modern information systems modeling. In the coming chapter we will discuss four philosophical issues in modeling parts of the real world and we will discuss these issues in the light of the semantical study of the language of categorial graphs. We will show how these issues appear in the context of the categorial graph language. We do not propose a solution for the philosophical problems raised, but show that we can deal with several interpretations of the problematic issues in a clear way.