MLL PROOF NETS AS ERROR-CORRECTING CODES

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The study of the multiplicative fragment of Linear Logic without multiplicative constants (for short MLL) is successful from both semantical and syntactical point of view. In the semantical point of view there are good semantical models including coherent spaces. In the syntactical point of view the theory of MLL proof nets has obtained a firm status without doubt. On the other hand IMLL, an intuitionistic version of MLL is also studied. IMLL can be seen as a subsystem of MLL. IMLL is easier to be studied more deeply than MLL, because we can use intuitions inspired from the conventional lambda-calculus theory as well as graph-theoretical intuitions from the MLL proof nets theory.

In order to study MLL more deeply, how should we do? One approach is to interpret MLL intuitionistically by using Gödel's double negation interpretation. However in such an approach multiplicative constants must be introduced. Definitely introducing multiplicative constants makes things complicated. Another approach we propose in this paper is to adopt *coding theoretic* framework.

Coding theory is very useful for real world applications. A notable example is digital television. Basically, coding theory is to study a way of detecting and/or correcting data that may be true or false. In this paper we propose a novel approach for analyzing proof nets of MLL by coding theory. We define families of proof structures and introduce a metric space for each family. In each family,

1. an MLL proof net is a real code
2. a proof structure that is not an MLL proof net is a false code.

In this talk we describe a summary about results we have obtained so far, using examples.

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