Some Issues about Proof Search in Linear Logic
- abstract -

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Abstract

Linear logic (LL) is a powerful and expressive logic that appears well-suited to analyse and improve in a finer way some programming paradigms as *proofs-as-programs*, *proofs-as-computations* or *proof-search-as-computation* [8]. Specification logics and frameworks based on LL, present compromises between the expressiveness of the underlying logic, its proof-theoretic properties and also some operational requests. In this setting, efficient methods are necessary for provability search and also for proof construction in various logical fragments [7].
The analysis and the automated construction of new semantic structures such as *proof nets* [9, 3] can be seen as an issue for proof-search, with some relationships with more classical and efficient search methods. The interest of such structures will be emphasized in different ways: their relationships with based-on connections provability characterizations [4], their use to analyse non-provability in commutative and mainly non-commutative logics [6], the use of labelled proof nets to consider the linear intuitionistic provability from linear classical search and to propose a method that is complete [2]. But some questions arise: is a similar analysis possible for other substructural logics ? can such technique be integrated into logical frameworks or specification logics ?
The study of completeness results is also essential to propose semantics that could have strong impact on proof-search. For instance, game semantics and the connected full completeness results [1] is an appropriate attempt to capture some dynamical aspects behind linear logic. We will show how a revised semantics of intuitionistic linear logic, that is complete, allows to naturally establish the non-provability of some formulae [5]. Further work could be devoted, in this setting, to new proof-and-refutation systems with effective constructions of counter-models.

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