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Title: Lazy Grounding algorithms for Answer Set Programming

Answer set programming (ASP) is a formalism in which combinatorial (optimization) problems can be modeled easily, due to a well-developed first-order modeling language. For this language, efficient solvers have been developed. Most of these solvers work in two phases: first the first-order variables are eliminated by a technique called grounding, second, a search algorithm for variable-free ASP is deployed to find the actual solutions to the original problem. While this often works well, recently the awareness grew of the fact that many problems exist in which the first step is not feasible (the grounding is too large and only small parts of it are relevant), calling for different solutions. One solution that stands out is integrating the two phases and only grounding those parts of the problem that are relevant for the search algorithm. This is referred to as lazy grounding.
Some lazy grounding solutions have been developed, but on many traditional problems they turn out to be far from efficient enough to compete with the traditional approach. The state-of-the art not just lacks competitive lazy grounding algorithms, but also a fundamental understanding of why there is such a big difference in speed. I want to analyze where those differences in speed come from and develop novel algorithms that overcome these weaknesses, thereby achieving the next big jump in answer set programming.

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