

# Solving FD constraints incrementally using KiCS2

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A constraint programming system usually consists of two main components: a modelling language used to describe a constraint satisfaction problem and a constraint solver searching for solutions to the given problem by applying specific algorithms. As constraint programming and functional logic languages share some common features, like computing with logic variables or the use of backtracking for non-deterministic search, it is reasonable to embed a modelling language for finite domain constraints in a functional logic language like Curry. We consider KiCS2, a Curry compiler translating functional logic Curry programs into purely functional Haskell programs. We presented the integration of finite domain constraints into KiCS2 in a previous work by collecting all constraints occurring during a program run and passing the entire constraint model to a functional constraint solver framework. In this work we pursue a slightly different approach reusing the KiCS2 internal representation of finite domain constraints as data terms but this time passing them to an incremental solver back end. In this manner we avoid the code duplication introduced by non-deterministic constraint models as well as the overhead resulting from generating complex intermediate constraint representations. Furthermore, this approach enables us to investigate the constraint search space by using the different search strategies already provided by KiCS2.