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In the field of inductive theorem proving syntactical differences between the induction hypothesis and induction conclusion are used in order to guide the proof. We use coloring of terms [Hut90, Hut97c] to perform the rippling process and there is considerable evidence of its success on practical examples. Recently we gave a general formalisation of coloring terms in a higher-order setting [HuKo97]. We introduced a simply-typed lambda calculus with color annotations and presented algorithms for unification, pre-unification and pattern unification. Our work is a formal basis to the implementation of rippling in a higher-order setting.

In order to cope with large case studies arising from the application of formal methods in an industrial setting [HLS+96a, HLS+96b], we developed new techniques using coloring terms to support hierarchical proof planning [CH94, Hut96, Hut97a, Hut97b, Hut97d] which is implemented into the INKA-system [BHH+86, HuSe96]. Following the paradigm of difference reduction, proofs are obtained by removing syntactical differences between parts of the formula to be proven step by step. To guide this manipulation we introduce several types of abstractions on terms. These abstractions are parameterized by the individual goals of the manipulation and are especially designed to ease the proof search based on heuristics. The hierarchical approach and thus the decomposition of the original goal into several subgoals enables the use of different abstractions or different parameters of an abstraction within the proof search.

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