Proof System for Plan Verification

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In this paper we propose Hoare style proof systems called PR\(_D^0\) and PRKW\(_D^0\) for plan generation and plan verification under 0-approximation semantics of the action language \(A_K\). In PR\(_D^0\) (resp. PRKW\(_D^0\)), a Hoare triple of the form \(\{X\}c\{Y\}\) (resp. \(\{X\}c\{KWp\}\)) means that all literals in \(Y\) become true (resp. \(p\) becomes known) after executing plan \(c\) in a state satisfying all literals in \(X\). The proof systems are shown to be sound and complete, more importantly, they provide a way to efficiently generate and verify longer plans from existing verified shorter plans by applying so-called composition rule, provided that enough number of shorter plans have been properly stored. The idea is essentially a tradeoff between space and time, we refer it to off-line planning and argue that it could be applied to real world domains.

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