Contents

1 Missing

- related work (quantifier free, local proofs, propositional)

1.1 Possible TODOs

- LK-algorithm with equality
- LK-algorithm with grey cuts

2 Intro/Motivation

vague description

2.1 Craig Interpolation

statement, proof (in resolution? how to prove best there?)
proof from wikipedia?

idea of construction from proofs
interpolation in HOL (gegenbeispiel?)

2.1.1 Problem of equality

equality in interpolant necessary

2.2 Applications, Usages

erst nach statement um es formal verwenden zu können
McMillan-style practical results (Overapproximation of reachable states)
auch von Henzinger. Abstractions from proofs
relation of interpolant length to min proof length (pudlak97)

3 Constructive Proofs/Algorithms for interpolation w.r.t. how they (can) handle equality

3.1 Resolution

3.1.1 Interpolation is skolemisation-invariant

3.2 Reduction to FOL without equality (Craig)

not practical, but proves the basic result

3.3 Overbinding during interpolant extraction as in Takeuti

excludes function symbols and equality -> currently open question whether that can handle equality
reduction of function symbols to predicate symbols

3.4 Overbinding as second step as in Baaz/Leitsch

show proof technique, does not work in presence of equality (destroyed by replacing terms by variables, e.g. $a = b \vdash f(a) = f(b)$, but $a = b \nvdash x = f(b)$.

3.5 Huang

present full paper

4 Further results – theory

4.1 Semantic proofs – model theoretic perspective

shoenfield, chang/keisler

direct model theoretic proof of interpolation as in D'Silva: Propositional Interpolation and Abstract Interpretation ?

4.2 Beth definability

4.3 Lyndon

also henkin, oberschelp, motohashi, fujiwara

possibly add as strengthenings right after craigs result?