Schmidt-Schauß, Manfred
Subsumption in KL-ONE is undecidable. (English) Zbl 0709.68096

Summary: [For the entire collection see Zbl 0699.00013.]

It is shown that in the frame-based language KL-ONE it is undecidable whether one concept is subsumed by another concept. In fact a rather small sublanguage of KL-ONE called $\mathcal{ALR}$ is used which has only the concept forming operators conjunction, value restriction, and role value maps using only ‘$=$’. In particular, number restrictions are not used. The language $\mathcal{ALR}$ can be viewed as an extension of feature terms without complements and unions, where features have sets as values instead of elements. Our result shows that there is a basic difference between feature terms and KL-ONE, since the complexity of subsumption switches from quasi-linear to undecidable if the restriction is dropped that roles are functional.

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knowledge representation language; frame-based language; undecidable