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Protocol of on-line discussion during November, 1997
about the following research article:

Michael Thielscher

A Theory of Dynamic Diagnosis

Q1. **Rob Miller** (3.11)

Michael, a question regarding the relative likelihoods of different components failing:

It seems to me that, in the absence of specific domain knowledge to the contrary, it's right to prefer explanations of system failure which are minimal in terms of the number of failures of individual components, other things being equal (this is one aspect of how your main example works, if I've understood correctly). But you also mention that good diagnosis is able to "take into account a priori knowledge of differences in the likelihood of components to break" (an example might be the knowledge that relays are more likely to fail than resistors). Could you say a little more about this in relation to your approach? Would you perhaps use more than one "ab" predicate, with some sort of prioritised minimisation between the predicates?

A1. **Michael Thielscher** (3.11)

Rob,

My theory does indeed respect domain knowledge of the kind you mention. This knowledge is formally represented by a partial ordering among the instances of the (unique) *ab* predicate–which is equivalent to your suggestion of allowing a priority hierarchy of different *ab* predicates. The notion of preferred models (Definition 10) reflects a given partial ordering in that more unlikely instances of *ab* are preferably minimized. As a consequence, the axiomatization of the theory by means of the Fluent Calculus (Section 5) employs Brewka's prioritized extension to classical Default Logic.