Exploring Argumentation Based Semantics for Relevance Logic

(Abstract)

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Among the formal semantics that have been suggested for relevance logic(s), the relational framework introduced by Routley and Meyer is of particular importance; see, eg., [5]. While the use of a ternary relation turned out to be a powerful and flexible tool for characterizing $R$ and various logics in its neighborhood, it also sparked a long lasting controversy regarding the nature and value of this semantic framework. In [1] eleven prominent proponents defend the Routley-Meyer semantics against the accusation that the framework merely amounts to a purely formal characterization of relevant validity. They argue that the (central) ternary relation can be interpreted in various ways that shed light on the very nature of conditionality from a relevance logic point of view. More recently, Michael Dunn, one of the major players in this field, has revisited the issue about the informal interpretation of the relational semantics for $R$ (and beyond) and suggests that one can systematically relate the relational framework to the concept of relevance as it is used in linguistics [4].

The aim of our contribution is to add yet a further, seemingly so far unexplored item to the stock of possible readings of the ternary relation $R$ of Routley-Meyer semantics. More precisely, we suggest to identify the points/states/pieces of information related by $R$ with arguments and to read $Rxyz$ as ‘the arguments $x$ and $y$ jointly support the argument $z$’. This is in line with an analysis of $Rxyz$ as ‘$x \circ y \leq z$’, where in our case the operation ‘$\circ$’ denotes the combination of arguments and the order ‘$\leq$’ corresponds to the support relation between arguments. We argue that the following five requirements are informally satisfied under this reading:

1. (Identity) $R0xx$
2. (Commutativity) $Rxyz \Rightarrow Ryxz$
3. (Associativity) $\exists v (Rxyv \& Rvzu) \Rightarrow \exists v (Rxva \& Ryzv)$
4. (Idempotence) $Rxxx$
5. (Monotonicity) $Rxyz \& R0xx' \Rightarrow Rx'yz$

The base point 0 is interpreted here as a neutral argument, that is neither in conflict nor strengthens any other argument. Also the valuational clauses of the corresponding definition of ‘$|$’ turn out to be plausible if we read ‘$x \models A$’ as: ‘according to argument $x$ the statement $A$ is acceptable’. In particular, the clause

$$x \models A \rightarrow B \text{ iff whenever } Rxyz \text{ and } y \models A \text{ then } z \models B$$
now stipulates that $A \rightarrow B$ is acceptable according to argument $x$ iff the following holds: if $A$ is acceptable when $x$ is combined with argument $y$ then $B$ is acceptable according to $z$, whenever $z$ is supported by the combination of $x$ and $y$.

The above mentioned conditions provide a semantics for the positive fragment $R^+$ of $R$. Interpreting negation is more delicate. We will discuss various options for assigning argumentation based meaning to corresponding extensions of the relational semantics. Furthermore, following Routley and Meyer, we consider various additional requirements for the ternary relation that lead to characterizations of several related logic. In our case, these additional conditions amount to particular properties of argument combination.

If time permits, we will also discuss specific instances of our abstract notion of argument. Concretely, we suggest to adopt the definition of [2], where an argument consists of a minimal and consistent set of ‘support formulas’ and a further formula, representing the claim made by the argument. We will also explore which versions of the support relation between such arguments, as discussed eg. in [3], are compatible with our interpretation of relevant validity.

References