Concerted Instant-Interval
Temporal Semantics II:
Temporal Valuations and Logics of Change

ALEXANDER BOCHMAN

Abstract The general problem of the relationship between instant-based and interval-based temporal semantics is studied. The paper is in two parts. In the first part we specified conditions for the mutual definability of instant and interval temporal structures. In this second part we extend this 'area of agreement' for temporal semantics proper and consider some natural 'logics of change' generated by this correspondence.

In the first part of our paper we considered the possibilities of mutual definability for instant-based and interval-based temporal ontologies. Here we will try to extend this 'agreement area' on temporal semantics. We will consider various instant and interval valuations and will try to determine the conditions for their definability in terms of each other. It will be shown that such definable valuations give rise to natural logics, which could be regarded as logics of change.

1 Technical preliminaries   We will be working in the frameworks of open dense linear instant-interval structures. Valuations on these structures will be represented as valuation predicates, that is, $[p]_i$ will denote a two-place valuation predicate $V(p,i)$ with respect to propositions and times (either instants or intervals). We will also be using the following notions:

Definition 1
 (i) A point α is a *boundary point* of an interval t (in notation, $\alpha + t$) iff there is another point β such that t is bounded by these points.
 (ii) A point α is an *internal point* of an interval t (in notation, $\alpha <\cdot\ t$) iff it belongs to t but is not a boundary point of it.