§0 Introduction

(1) $\phi \to \Diamond K\phi$ (VT)

(2)* $\phi \to K\phi$

(3) $\psi \wedge \neg K\psi$ (NON-OMNISCIENCE)

(4) $\phi \to FK\phi$ (DISCOVERY)

(5) $A\phi \to \Diamond KA\phi \quad \equiv \quad (3.a)\ @_t\phi \to \Diamond K@_t\phi$

(6) $N\phi \to FKN\phi \quad \equiv \quad (3.b)\ @_t\phi \to FK@_t\phi$

(7) $@\phi \leftrightarrow \Box@\phi$ ($\Box$-COLLAPSE)

(8) $@\phi \leftrightarrow K@\phi$ (K-COLLAPSE)

§§1-2 The Approach

SYNTAX: $\Phi = \{p, q, r, ...\}$, $\mathcal{T} = \{\bar{t} \mid t \in T\}$

$\mathcal{L}\ ::=\ \phi \mid \bot \mid \neg\phi \mid \phi \wedge \psi \mid P\phi \mid F\phi \mid @_{\bar{t}}\phi \qquad \forall\phi \in \Phi,\ \bar{t} \in \mathcal{T}$

SEMANTICS: $\mathcal{M} = \langle W \times T, <^F, V\rangle$ with $V : \Phi \to \mathcal{P}(W)$.

$\langle w,t\rangle \models p$ iff $w \in V(p)$

$\langle w,t\rangle \models \phi \wedge \psi$ iff $\langle w,t\rangle \models \phi$ and $\langle w,t\rangle \models \psi$

$\langle w,t\rangle \models \neg\phi$ iff $\langle w,t\rangle \not\models \phi$

$\langle w,t\rangle \models F\phi$ iff $\exists t' : t < t',\ \langle w,t'\rangle \models \phi$

$\langle w,t\rangle \models P\phi$ iff $\exists t' : t' < t,\ \langle w,t'\rangle \models \phi$

$\langle w,t\rangle \models @_{\bar{t'}}\phi$ iff $\langle w,t'\rangle \models \phi$

$\langle w,t\rangle \models [\Gamma]\phi$ iff $\forall w^* : \langle w,t\rangle \approx_\Gamma \langle w^*,t\rangle \Rightarrow \langle w^*,t\rangle \models \phi$

$\langle w,t\rangle \models \langle\Gamma\rangle\phi$ iff $\langle w^*,t\rangle \models \neg[\Gamma]\neg\phi$

where $(\langle w,t\rangle \approx_\Gamma \langle w^*,t\rangle)$ iff $\forall t' < t, \langle w,t'\rangle \models \phi \iff \langle w^*,t'\rangle \models \phi$

§3 K = [Γ]

(a) $@_t\phi \to \Diamond K@_t\phi$ (= 5)

(b) $@_t\phi \to FK@_t\phi$ (= 6)

(c) $@_t\phi \to FKP@_t\phi$ (= (d)$[@_t/\phi]$)

(d) $\phi \to FKP\phi$ (= (c)$[\phi/@_t]$)

§4 Burgess' Approach

(i) $G\phi \to FK\phi$ (Reformulates: 4)

(ii) $P\phi \to FKP\phi$ (Follows from: $T \cup \{i\}$)

(iii) $\phi \to FKP\phi$ (Follows from: $T \cup \{i\}$)

(iv) $F\phi \to FKP\phi$ (Follows from: $T \cup \{i\}$)

(v) $G\phi \to FKG\phi$ (Follows from: $T \cup \{i\}$)

(2)* $\phi \to K\phi$ (Doesn't follow from: $T \cup \{i\}$)

§5 $\Diamond = \langle\Gamma\rangle$

(4) $\phi \to FK\phi$ (DISCOVERY)

(b) $@_t\phi \to FK@_t\phi$ (= 6)

(B) $@_t\phi \to \Diamond FK@_t\phi$ (Reformulates: b = 6)

(B^Γ) $@_t\phi \to \langle\Gamma\rangle FK@_t\phi$ (Explicates: B, cf. Fig. 3)

§6 [Γ] as a general *ceteris paribus* operator

▷ P & S have assumed Γ to be a fixed set that satisfies certain conditions (cf. pg. 81). But one may let Γ be an *arbitrary* set of sentences and thereby allow different interpretations of [Γ] and ⟨Γ⟩.