Contents

Chapter 1

Philosopherers

$OrderTrichotomy(<, S) := \forall_{x,y \in S}(x < y \veebar x = y \veebar y < x)$
$OrderTransitivity(<, S) := \forall_{x,y,z \in S}\big((x < y \wedge y < z) \implies x < z\big)$
$Order(<, S) := OrderTrichotomy(<, S) \wedge OrderTransitivity(<, S)$
$BoundedAbove(E, S, <) := Order(<, S) \wedge E \subset S \wedge \exists_{\beta \in S}\forall_{x \in E}(x \leq \beta)$
$BoundedBelow(E, S, <) := Order(<, S) \wedge E \subset S \wedge \exists_{\beta \in S}\forall_{x \in E}(\beta \leq x)$
$UpperBound(\beta, E, S, <) := Order(<, S) \wedge E \subset S \wedge \beta \in S \wedge \forall_{x \in E}(x \leq \beta)$
$LowerBound(\beta, E, S, <) := Order(<, S) \wedge E \subset S \wedge \beta \in S \wedge \forall_{x \in E}(\beta \leq x)$
$LUB(\alpha, E, S, <) := UpperBound(\alpha, E, S, <) \wedge \forall_{\gamma}\big(\gamma < \alpha \implies \neg UpperBound(\gamma, E, S, <)\big)$
$GLB(\alpha, E, S, <) := LowerBound(\alpha, E, S, <) \wedge \forall_{\beta}\big(\alpha < \beta \implies \neg LowerBound(\beta, E, S, <)\big)$
$LUBProperty(S, <) := \forall_{E}\Big(\big(\emptyset \neq E \subset S \wedge BoundedAbove(E, S, <)\big) \implies \exists_{\alpha \in S}\big(LUB(\alpha, E, S, <)\big)\Big)$
$GLBProperty(S, <) := \forall_{E}\Big(\big(\emptyset \neq E \subset S \wedge BoundedBelow(E, S, <)\big) \implies \exists_{\alpha \in S}\big(GLB(\alpha, E, S, <)\big)\Big)$
((LUBPropertyImpliesGLBProperty)) $LUBProperty(S, <) \implies GLBProperty(S, <)$

(1)	$LUBProperty(S, <) \implies \ldots$	wts: 2
(1.1)	$\big(\emptyset \neq B \subset S \wedge BoundedBelow(B, S, <)\big) \implies \ldots$	wts: 1.2
(1.1.1)	$Order(<, S) \wedge \exists_{\delta' \in S}\big(LowerBound(\delta', B, S, <)\big)$	from: 1.1
(1.1.2)	$\lvert B \rvert = 1 \implies \ldots$	wts: 1.1.3
(1.1.2.1)	$\exists_{u'}(u' \in B) \;\blacksquare\; u := choice(\{u' \mid u' \in B\}) \;\blacksquare\; B = \{u\} \;\blacksquare\; GLB(u, B, S, <)$	from: 1.1.2
(1.1.2.2)	$\exists_{\epsilon_0 \in S}\big(GLB(\epsilon_0, B, S, <)\big)$	
(1.1.3)	$\lvert B \rvert = 1 \implies \exists_{\epsilon_0 \in S}\big(GLB(\epsilon_0, B, S, <)\big)$	
(1.1.4)	$\lvert B \rvert \neq 1 \implies \ldots$	wts: 1.1.5
(1.1.4.1)	$\forall_{E}\Big(\big(\emptyset \neq E \subset S \wedge BoundedAbove(E, S, <)\big) \implies \exists_{\alpha \in S}\big(LUB(\alpha, E, S, <)\big)\Big)$	from: 1
(1.1.4.2)	$L := \{s \in S \mid LowerBound(s, B, S, <)\}$	
(1.1.4.3)	$\lvert B \rvert > 1 \wedge OrderTrichotomy(<, S) \;\blacksquare\; \exists_{b_1' \in B}\exists_{b_0' \in B}(b_0' < b_1')$	from: 1.1.1 wts: 1.1.4.7
(1.1.4.4)	$b_1 := choice\Big(\{b_1' \in B \mid \exists_{b_0' \in B}(b_0' < b_1')\}\Big) \;\blacksquare\; \neg LowerBound(b_1, B, S, <)$	from: 1.1.4.2
(1.1.4.5)	$b_1 \notin L \;\blacksquare\; L \subset S$	
(1.1.4.6)	$\delta := choice\big(\{\delta' \in S \mid LowerBound(\delta', B, S, <)\}\big) \;\blacksquare\; \delta \in L \;\blacksquare\; \emptyset \neq L$	from: 1.1
(1.1.4.7)	$\emptyset \neq L \subset S$	
(1.1.4.8)	$\forall_{y \in L}\big(LowerBound(y, B, S, <)\big) \;\blacksquare\; \forall_{y \in L}\forall_{x \in B}(y \leq x)$	from: 1.1.4.2 wts: 1.1.4.10
(1.1.4.9)	$\forall_{x \in B}\Big(x \in S \wedge \forall_{y \in L}(y \leq x)\Big) \;\blacksquare\; \forall_{x \in B}\big(UpperBound(x, L, S, <)\big)$	
(1.1.4.10)	$\exists_{x \in S}\big(UpperBound(x, L, S, <)\big) \;\blacksquare\; BoundedAbove(L, S, <)$	
(1.1.4.11)	$\emptyset \neq L \subset S \wedge BoundedAbove(L, S, <)$	

(1.1.4.12) $\exists_{\alpha' \in S}\big(LUB(\alpha', L, S, <)\big)$ ▮ $\alpha := choice\Big(\{\alpha' \in S | \big(LUB(\alpha', L, S, <)\big)\}\Big)$ from: 1.1.4.1 wts: 1.1.4.21

(1.1.4.13) $\forall_x \big(x \in B \implies UpperBound(x, L, S, <)\big)$ from: 1.1.4.9 wts: 1.1.4.17

(1.1.4.14) $\forall_x \big(\neg UpperBound(x, L, S, <) \implies x \notin B\big)$

(1.1.4.15) $\gamma < \alpha \implies \dots$ wts: 1.1.4.16

(1.1.4.15.1) $\neg UpperBound(\gamma, L, S, <)$ ▮ $\gamma \notin B$ from: 1.1.4.12, 1.1.4.14

(1.1.4.16) $\gamma < \alpha \implies \gamma \notin B$ ▮ $\gamma \in B \implies \gamma \geq \alpha$

(1.1.4.17) $\forall_{\gamma \in B}(\alpha \leq \gamma)$ ▮ $LowerBound(\alpha, B, S, <)$

(1.1.4.18) $\alpha < \beta \implies \dots$ wts: 1.1.4.19

(1.1.4.18.1) $\forall_{y \in L}(y \leq \alpha < \beta)$ ▮ $\forall_{y \in L}(y \neq \beta)$ from: 1.1.4.12

(1.1.4.18.2) $\beta \neq L$ ▮ $\neg LowerBound(\beta, B, S, <)$

(1.1.4.19) $\alpha < \beta \implies \neg LowerBound(\beta, B, S, <)$ ▮ $\forall_{\beta \in S}\big(\alpha < \beta \implies \neg LowerBound(\beta, B, S, <)\big)$

(1.1.4.20) $LowerBound(\alpha, B, S, <) \wedge \forall_{\beta \in S}\big(\alpha < \beta \implies \neg LowerBound(\beta, B, S, <)\big)$ from: 1.1.4.17, 1.1.4.19

(1.1.4.21) $GLB(\alpha, B, S, <)$ ▮ $\exists_{\epsilon_1 \in S}\big(GLB(\epsilon_1, B, S, <)\big)$

(1.1.5) $|B| \neq 1 \implies \exists_{\epsilon_1 \in S}\big(GLB(\epsilon_1, B, S, <)\big)$

(1.1.6) $\Big(|B| = 1 \implies \exists_{\epsilon_0 \in S}\big(GLB(\epsilon_0, B, S, <)\big)\Big) \wedge \Big(|B| \neq 1 \implies \exists_{\epsilon_1 \in S}\big(GLB(\epsilon_1, B, S, <)\big)\Big)$ from: 1.1.3, 1.1.5

(1.1.7) $(|B| = 1 \vee |B| \neq 1) \implies \exists_{\epsilon \in S}\big(GLB(\epsilon, B, S, <)\big)$ ▮ $\exists_{\epsilon \in S}\big(GLB(\epsilon, B, S, <)\big)$

(1.2) $\big(\emptyset \neq B \subset S \wedge BoundedBelow(B, S, <)\big) \implies \exists_{\epsilon \in S}\big(GLB(\epsilon, B, S, <)\big)$

(1.3) $\forall_B\Big(\big(\emptyset \neq B \subset S \wedge BoundedBelow(B, S, <)\big) \implies \exists_{\epsilon \in S}\big(GLB(\epsilon, B, S, <)\big)\Big)$

(1.4) $GLBProperty(S, <)$

(2) $LUBProperty(S, <) \implies GLBProperty(S, <)$

FUCKING DONE

Chapter 2

First Chapter

(1) First

(1.1) Second

(1.2) Third

(2) Fourth

This will be an empty chapter and I will put some text here

$$\sum_{i=0}^{\infty} a_i x^i \tag{2.1}$$

The equation 2.1 shows a sum that is divergent. This formula will later be used in the page **??**.
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