Curso de Problemas de Lógica:
Lógica Modal

Segunda sesión

Otoño de 2017

Raymundo Morado

Esta sesión

- Implicación Material
- Aristóteles
- C. I. Lewis

Preliminares

Responda el cuestionario sobre mi artículo.

Simbolice “De A no se sigue B”.

Silogismo Modal

- Analitiká Protera A8-22, especialmente 13ss, Peri Hermeneias 13, 21ss.
- To dynatón
- To endejómenon
- To adýnatón
- To anankéon

En *Peri Hermeneias*

- “Puede ser” contradice “No puede ser”
- “Puede no ser” contradice “No puede no ser”
- Si puede ser, no es imposible
- Si es necesario, en un sentido (además) puede ser
- Si es necesario, en un sentido no (meramente) puede ser

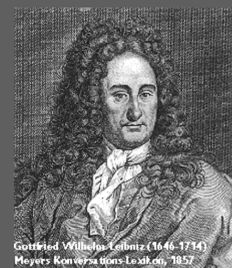
Metafísica V, 5

- Se llama necesario aquello sin lo cual, como con causa, no es posible vivir [...]. También aquello sin lo cual no es posible que exista o se genere el bien, ni desechar el mal o librarse de él [...]. Además, lo forzoso y la violencia [...] Además, lo que no puede ser de otro modo, decimos que es necesario que sea así; y según este sentido de lo necesario se dicen también necesarias en cierto modo todas las demás cosas. [...] Además, la demostración es una de las cosas necesarias, porque no es posible que la conclusión sea de otro modo, si se ha demostrado absolutamente

- Proposición de inesse: “La candidata es una solución”. Incluso, “La posible candidata es una posible solución”.
- Proposición modal: “***Es posible que*** la candidata sea una solución”. Incluso, “Es posible que la posible candidata sea una posible solución”.

Mundos Posibles

- La idea en Duns Scotus (?), Descartes (?), Leibniz, Carnap.


Gottfried Wilhelm Leibniz (1646-1714)
Meyers Konversations-Lexikon, 1857

Tarea 2
Para antes del próximo viernes

(0) Los que no entregaron la anterior completa, entregarla (ya no cuenta para la calificación).

Lea mi artículo y vuelva a responder el cuestionario. Envíe por correo electrónico las respuestas:
1.( ), 2.( ), 3.( ), 4.( ), 5.( ), 6.( )

Lea las páginas 291 a 339 de Clarence Irving Lewis, *A Survey of Symbolic Logic* y haga los siguientes ejercicios:

100 Teoremas

X1 Óscar	1.	2.1	1.	2.61	1.	2.731	3.02	3.31
X2 Mar	2.	2.11	2.	2.51	2.	2.74	3.11	3.32
X3 Ángel	3.	2.12	3.	2.62	3.	2.75	3.12	3.33
X4 Andrea	4.	2.2	4.	2.63	4.	2.76	3.13	3.34
X5 Christian	5.	2.21	5.	2.64	5.	2.77	3.14	3.21
X6 Masao	6.	2.3	6.	2.7	6.	2.8	3.15	3.22
X7 Denisse	7.	2.4	7.	2.71	7.	2.81	3.21	3.23
X8 Felipe	8.	2.5	8.	2.712	8.	2.9	3.22	3.24
X9 Jesús	9.	2.51	9.	2.72	9.	2.91	3.23	3.25
X0 Cristina	10.	2.6	10.	2.73	10.	3.01	3.24	3.31

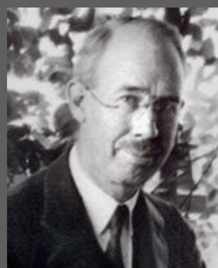
X1 Óscar	3.32	3.47	4.12	4.32	4.45
X2 Mar	3.33	3.48	4.13	4.33	4.51
X3 Ángel	3.34	3.52	4.14	4.34	4.52
X4 Andrea	3.35	3 .53	4 .15	4.35	4.53
X5 Christian	3.41	3.54	4.16	4.36	4.54
X6 Masao	3.42	3.55	4.17	4.37	4.55
X7 Denisse	3.43	3.56	4.21	4.41	4.56
X8 Felipe	3.44	3.57	4.22	4.42	4.57
X9 Jesús	3.45	3.58	4.3	4.43	4.58
X0 Cristina	3.46	4.1	4.31	4.44	4.59

Para cada una de las 10 fórmulas que le toquen, haga las siguientes 5 cosas:

(A) Transcríbala literalmente al español
(B) Parafraséela en su idiolecto personal
(C) Ejemplifíquela con algo filosóficamente interesante
(D) Evalúela diciéndo qué tanto apostaría a que es verdad
(E) Pruébela mediante otras reglas y principios de la siguiente manera:

(# de línea). fbf #(s) de línea(s), Justificación

Clarence Irving Lewis (1883-1964)



A Survey of Symbolic Logic, 1918
CHAPTER V: THE SYSTEM OF STRICT IMPLICATION

VS. MATERIAL IMPLICATION

- p.291: material implication, p c *q* meaning exactly "The statement, *'p* is true and q false,' is a false statement".
- p.291: Its divergence from the "implies" of ordinary inference is exhibited in such theorems as "A false proposition implies any proposition", and "A true proposition is implied by any proposition".

MODALITIES AND NOTIONS

- p. 324: It is impossible to escape the assumption that there is some definite and "proper" meaning of "implies". [...] This is no more than to say there are certain ways of reasoning that are correct or valid, as opposed to certain other ways which are incorrect or invalid.
- p.333 Any set of mutually consistent propositions may be said to define a "possible situation" or "case" or "state of affairs".

- p. 202: The addition of the idea of impossibility gives us five truth-values, all of which are familiar logical ideas:
- *(1) p, "p* is true".
- *(2) -p, "p* is false".
- *(3) ~p, "p* is impossible".
- (4) - *~p,* "It is false that *p* is impossible" -i. e., *"p* is possible".
- (5) ~ *-p,* "It is impossible that *p* be false "-i. e., *"p* is necessarily true".

- p.293:
- *1·01 Consistency. poq* = - ~*(pq).* Def.
- *1·02 Strict Implication.* p -3 *q* = ~*(p -q).* Def.
- *1·03 Material Implication. p* c *q* = -*(p -q).* Def.
- *1·04 Strict Logical Sum. p/\q* = ~*(-p -q).* Def. [Confundente; hoy es "v"]
- 1·05 M*aterial Logical Sum. p + q* = -(*-p -q).* Def.
- *1·06 Strict Equivalence. (p = q) = (p -3 q) (q -3 p).* Def.
- We here define the defining relation itself
- *1·07 Material Equivalence. (p ≡ q) = (p* c *q) (q* c *p).* Def.

- *p.304:* A *necessarily true* proposition --e.g., "I am", as conceived by Descartes -is one whose denial strictly implies it. [...] A *true* proposition is one which is *materially* implied by its own denial. [...] an impossible or absurd proposition is one which strictly implies its own denial and is not consistent with itself. [...] A false proposition is one which *materially* implies its own negation

- p. 321: *a* c b is the relation "All members of *a* are also members of b"-a relation of extension. [...] *a –3 b* is the corresponding relation of intension
- p.322: *a* -3 b may be correctly interpreted "The class-concept of *a,* that is, phi, contains or implies the
- class-concept of b, that is, psi".
- p.323: The relation intensions and extensions is *unsymmetrical,* not symmetrical as the medieval logicians would have it.

The System of Strict Implication

- p. 294: The *postulates* of the system are as follows:
- *1·1 pq -3 qp*
- *1·2 qp -3 p*
- ***1·3*** p -3 pp
- *1·4 p(q r) -3 q(p r)*
- 1.5 *p -3* -(-p)
- ***1·6*** (p -3 *q)(q* -3 *r) -3 (p -3 r)*
- *1·7* ~p -3 -p
- *1·8* p -3 q = -q -3 -p

- p.295: The *operations* by which theorems are to be derived from the postulates are three:
- *1. Substitution.-Any* proposition may be substituted for *p* or *q* or *r*, etc. Also, of any pair of expressions related by =, either may be substituted for the other.
- *2. Inference. -If p* is asserted and *p -3 q* is asserted, then *q* may be asserted. (Note that this operation is not assumed for material implication, *p c q.)*
- *3. Production.-If p* and *q* are separately asserted, *p q* may be asserted.

- *p.308:* For every postulate and theorem in which the asserted relation is ~, there is a corresponding theorem in which the asserted relation is /\, and vice versa.

- [Me: Ex falso quodlibet. Granting 3 principles,
- (1) p&q / q Simplification
- (2) (p&q) -> r, q, ¬r /¬p
- (3) (p&q) ->r, r->s / (p&q) -> s
- it follows.]

- p. 336: we can demonstrate that, in the ordinary sense of "implies", an impossible proposition implies anything and everything. It will be granted that in the "proper" sense of "implies", (1) *"p* and *q* are both true" implies "*q* is true". And it will be granted that (2) if two premises *p* and *q* imply a conclusion, *r,* and that conclusion, *r,* is false, while one of the premises, say *p,* is true, then the other premise, *q,* must be false.
- That is, if "All men are liars "and" John Blank is a man" together imply "John Blank is a liar", but "John Blank is a liar" is false, while "John Blank is a man" is true, then the other premise, "All men are liars ", must be false.
- And it will be granted that (3) If the two propositions, *p* and *q,* together imply *r,* and r implies *s*, then *p* and *q* together imply *s.* These three principles being granted, it follows that if *q* implies *r,* the impossible proposition *"q* is true but *r* false" implies anything and everything.

- For by (1) and (3), if *q* implies *r*, then *"p* and *q* are both true" implies *r.* But by (2), if *"p* and *q* are both true" implies *r, "q* is true but *r* is false" implies *"p* is false". Hence if *q* implies *r,* then "*q* is true *but r* is false" implies the negation of any proposition, *p.* And since 1) itself may be negative; this impossible proposition implies anything.
- "Today is Monday" implies "Tomorrow is Tuesday". Hence "Today is Monday and the moon is not made of green cheese" implies "Tomorrow is Tuesday". Hence "Today is Monday but tomorrow is not Tuesday" implies "It is false that the moon is not made of green cheese", or "The moon is made of green cheese".
- This may be taken as an example of the fact that an absurd proposition implies any proposition

- p. 336: Any proposition which should witness to the falsity of a law of logic, or of any branch of mathematics, implies its own contradiction and is absurd.
- p. 338: Any necessary proposition, i. e., any proposition, *q,* whose denial, not-q, implies its own negation, is implied by any proposition, *r.*

INCORPORATES MATERIAL IMPLICATION

- p. 291: Strict Implication contains Material Implication, as it appears in *Principia Mathematica,* as a partial-system
- p. 314: All the postulates and theorems of Material Implication can be derived from the postulates and definitions of Strict Implication: the system of Strict Implication *contains* the system of Material Implication.
- p.322: The intensional relation, -3, implies the extensional relation, c. *But the reverse does not hold.* The old "law" of formal logic, that if *a* is contained in b in extension, then b is contained in *a* in intension, and vice versa, is *false.* The connection between extension and intension is by no means so simple as that.

- p. 322: it *does not hold* that "A false proposition *strictly* implies any proposition", or that "A true proposition is *strictly* implied by any proposition"
- p.328 *Inference* depends upon meaning, logical import, *intension. a* c *b* is a relation purely of extension. Is this material implication, *a* c *b,* a relation which can validly represent the logical nexus of proof and demonstration? […] **It** makes a distinct difference whether the "cases" comprehended […] are all the possible cases, all *conceivable* individuals, or only all *actual* cases, all individuals which *exist* (in the universe of discourse). Either interpretation may consistently be chosen, but the consequences of the choice are important.

Recapitulación y avances

- La lógica modal tiene 23 siglos pero solamente uno de gran desarrollo.
- C. I. Lewis ofreció una extensión de la lógica clásica para poder manejar en el lenguaje objeto una noción de necesidad intensional de manera rigurosa y sistemática.
- En la próxima clase veremos cinco famosos sistemas que puede haber para la(s) noción(es) de implicación necesaria.