

Re: Tautologies Then and Now

Source: <http://sci.tech-archive.net/Archive/sci.logic/2004-12/0982.html>

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"Chris Menzel" <cmenzel@remove-this.tamu.edu> wrote in message news:slrncrgv29.do.cmenzel@philebus.tamu.edu...

> *On Thu, 09 Dec 2004 11:38:06 GMT, Stephen Harris said:*

>> ...

>>> *In pretty much any logic text in existence, a tautology is a sentence in the language of propositional logic that is true regardless of the assignment of truth values to its atomic components. "Tautology" used in any other way, in the context of mathematical logic, is, well, wrong. The more general notion that covers both propositional logic and first-order (and higher-order) logic is that of a logical truth, i.e., a sentence of a given language that is true in all interpretations of the language. So, alternatively, a tautology is a logical truth of propositional logic.*

>>>

>>> *Chris Menzel*

>>

>> *Would you comment on these quotes? * is my emphasis..*

>

> *No, I'll comment on the fact that you want me to comment on them.*

> *Apparently you think these quotes show that truth tables applied to*

> *"truth-functional proxies" of quantified argument schemas provide a*

> **general* method for testing first-order validity. They don't.*

No. Read what I wrote and tell me if you think I meant **general**.

Stephen wrote in a previous post:

"For tautologies there is a general method for showing intrinsic truth, a truth table. There is no general method for showing the intrinsic truth of valid statements. A general algorithm for proving a formula to be valid is not possible. But I'm wondering if in a particular class of cases, if there is a specific algorithm for proving formulae to be valid, which would function in principle like a constrained truth table."

SH: I used the term "valid" to apply to predicate logic (PL) because paul stated that tautology was not used in PL, but "universally valid".

I think that from the context it is clear that I'm distinguishing propositional

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logic from PL: "there is a general method" vs. "there is no general method".
I also wrote the above quote before finding the analytic_essay link.

> *In *some* cases they do, namely, if you restrict your attention to*
> *arguments consisting of formulas of monadic predicate logic (i.e.,*
> *formulas that involve only 1-place predicates), or if the argument in*
> *question is invalid and has a *finite* countermodel. This information*
> *is pretty much in the link you provide:*
>
>> http://www.lawrence.edu/fast/boardmaw/analytic_essay.html
>
> *Have a look at the penultimate paragraph and footnote 4.*
>

I read the whole essay. Which is why I changed my mind about Paul being right about the truth tables; I had doubts about it and kept researching.

Paul wrote:

>>> *Can you cite a text that extends truth tables beyond propositional*
>>> *logic? My professors always said that doesn't happen, and it certainly*
>>> *didn't in any of my texts.*

SH: I don't think Paul's statement is correct because there is an implicit "none" asserted and as you and the analytic_essay state, there is "some".

Paul also wrote: ... "...I said — that the term "tautology" is not applied outside propositional logic."

SH: But I don't think that can be exactly correct either in part because Paul posted,

"In predicate logic ... Formulas @ such that $V_M(@) = 1$ for all models M for the language from which @ is taken are called universally valid formulas (they are not normally called tautologies)."

L.T.F. Gamut. "Logic, Language, and Meaning: Volume 1, Introduction to Logic." The University of Chicago Press. p. 99.

SH: I don't think the author of the book would have used the qualifier "normally" (they are not normally called tautologies) if it were strictly true that the term "tautology" never applied to predicate logic which is "outside propositional logic", the boundary Paul claimed, "not applied".

I'm not actually faulting Paul, because this exception seems rather technical.

But I wondered if there were a possible practical use for this 'sometimes' situation which would elevate my objection from nitpicking to relevancy. I inked that this sometime "shortcut method" might be usable in a natural language translation program. They have appropriate ruled response filters that are tree-like. Maybe I have read this connection, I can't remember.

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Do you have a comment about the practical use for constructing "some" cases using the "short-cut method of truth value assignment, or by means of a truth table?" I usually read about chance, causation, and counterfactuals with a whiff of Smullyan, "What is the name of this book?..." By the way,

What is the name of your book?

Stephen

> *SH: I quoted Peter Suber because your fame has not preceded you to*
> *my limited knowledge of who is a quotable authority in logic.*

Shows what you know. ;-) Chris Menzel