

A minor observation about conditionals and logical equivalence

User 2473 • 14 Apr 2025

This post will just be a short note about an observation regarding conditionals in propositional logic. I actually read about this in a logic textbook a long time ago, but I don't remember which one exactly. Anyway, the observation is that two conditionals can be logically equivalent, but their converses are not logically equivalent. An example of this are the conditionals $P \rightarrow Q$ and $P \rightarrow (P \wedge Q)$. They are logically equivalent, as a truth table demonstrates, but their respective converses $Q \rightarrow P$ and $(P \wedge Q) \rightarrow P$ are not logically equivalent. Another, perhaps more striking example, are these two conditionals: $P \rightarrow (Q \rightarrow R)$ and $Q \rightarrow (P \rightarrow R)$. They are logically equivalent, but their respective converses $(Q \rightarrow R) \rightarrow P$ and $(P \rightarrow R) \rightarrow Q$ are not logically equivalent.