

The material conditional is transitive, i.e., the chain rule is valid:

$$\varphi \rightarrow \psi, \psi \rightarrow \chi \vDash \varphi \rightarrow \chi \quad (11)$$

The material conditional is equivalent to its contrapositive:

$$\varphi \rightarrow \psi \vDash \neg\psi \rightarrow \neg\varphi \quad (12)$$

$$\neg\psi \rightarrow \neg\varphi \vDash \varphi \rightarrow \psi \quad (13)$$

These are all useful and unproblematic inferences in mathematical reasoning. However, the philosophical and linguistic literature is replete with purported counterexamples to the equivalent inferences in non-mathematical contexts. These suggest that the material conditional \rightarrow is not—or at least not always—the appropriate connective to use when symbolizing English “if ... then ...” statements.

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Bibliography