MACM 101 Lecture 09-16 S1.6 - Pearce

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Friday, September 13, 2024

Review

0.1 Truth and Validity

- Truth is predicated on propositions, which are either true or false
- Validity is predicated on **deductive arguments**, which are either valid or invalid

0.2 Formal Definition of a Valid Argument

a deductive argument is valid if and only if the premises provide conclusive proof of the conclusion

Either of the following must hold:

- if the premises of a valid argument are all true, then its conclusion must also be true
- it is impossible for the conclusion of a valid argument to be false while its premises are true
- In other words, a tautology is a necessary and sufficient condition for a valid argument (???)

0.3 Example of a Modus Ponens

If $\sqrt{2} > \frac{3}{2}$, then $\sqrt{2}^2 > \frac{3}{2}^2$

We know that $\sqrt{2} > \frac{3}{2}$, Consequently, $2 > \frac{9}{4}$

The argument is valid because it is modus ponens, but it is not correct because the conclusion is false.

0.4 Modus Ponens

$$\begin{aligned} p \to q \\ p \\ \therefore q \end{aligned}$$

↑ Please fucking research this ↑

0.5 Modus Tollens

$$p \to q, \therefore \neg q \to \neg p$$

1 The Rules of Inference and Valid Argumentation

*Find table on the rules of inference from Rosen

$$\begin{aligned} p \to q & \quad (1) \\ \neg q \to \neg p & \quad (2) \\ \neg p \to r & \quad (3) \\ \neg q \to r & \quad (4) \\ r \to s & \quad (5) \\ \therefore \neg q \to s & \quad (6) \end{aligned}$$