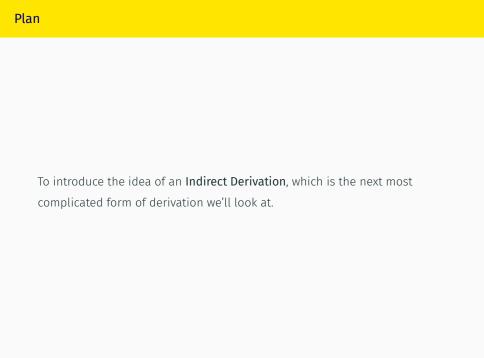
305 Lecture 08 - Indirect Derivations

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Carnap book, chapter 4.



Intuitively, they way to show $A \to B$ is to imagine/assume/suppose A is true, and show that then B will be true as well.

• That's what we'll do in Carnap.

Three New Tricks

- 1. Having the 'Show' be a conditional.
- 2. Starting with 'AS' not 'PR'.
- 3. Ending with Conditional Derivation CD.

Example

To prove:
$$P \rightarrow Q \vdash P \rightarrow \neg \neg Q$$

3.
$$P \rightarrow Q$$
:PR

What goes in 'Show' is still the conclusion, but it isn't what we end the proof with.

Example

To prove:
$$P \rightarrow Q \vdash P \rightarrow \neg \neg Q$$

We start with two kinds of underived

- lines.
- 2. Premises

Premises

To prove:
$$P \rightarrow Q \vdash P \rightarrow \neg \neg Q$$

3.
$$P \rightarrow Q$$
:PR

The premises, in this case line 3, you

Assumption

To prove:
$$P \rightarrow Q \vdash P \rightarrow \neg \neg Q$$

3.
$$P \rightarrow Q$$
:PR

The assumption is the thing on the left of what you're trying to prove - the **antecedent** of the conditional.

Conditional Proof

To prove:
$$P \rightarrow Q \vdash P \rightarrow \neg \neg Q$$

Then you can use all the regular rules that you've used so far, with the same constraints.

Conditional Proof

To prove:
$$P \rightarrow Q \vdash P \rightarrow \neg \neg Q$$

3.
$$P \rightarrow Q$$
:PR

6. :CD 5

The big difference is that you end with the **consequent** of what you're trying to show; the thing to the right of the \rightarrow .

Conditional Proof

To prove:
$$P \rightarrow Q \vdash P \rightarrow \neg \neg Q$$

6. :CD 5

And then (and this is a bit distinctive to Carnap), you write 'CD' for

Conditional Derivation, not 'DD' for Direct Derivation.

For Next Time

- · Read chapters 4 and 5.
- We will talk especially about what happens when these conditional derivations get nested.
- Finish the first assignment the exercises from chapters 1 and 3.