

syn.1 The Language of Basic Modal Logic

mod:syn:lan:
sec

Definition syn.1. The basic language of modal logic contains

1. The propositional constant for **falsity** \perp .
2. The propositional constant for **truth** \top .
3. A **denumerable** set of **propositional variables**: p_0, p_1, p_2, \dots
4. The propositional connectives: \neg (negation), \wedge (conjunction), \vee (disjunction), \rightarrow (**conditional**), \leftrightarrow (**biconditional**).
5. The modal operator \Box .
6. The modal operator \Diamond .

Definition syn.2. *Formulas* of the basic modal language are inductively defined as follows:

1. \perp is an atomic **formula**.
2. \top is an atomic **formula**.
3. Every propositional variable p_i is an (atomic) **formula**.
4. If φ and ψ are **formulas**, then $(\varphi \wedge \psi)$ is a **formula**.
5. If φ and ψ are **formulas**, then $(\varphi \vee \psi)$ is a **formula**.
6. If φ and ψ are **formulas**, then $(\varphi \rightarrow \psi)$ is a **formula**.
7. If φ and ψ are **formulas**, then $(\varphi \leftrightarrow \psi)$ is a **formula**.
8. If φ is a formula, so is $\Box\varphi$.
9. If φ is a formula, then $\Diamond\varphi$ is a **formula**.
10. Nothing else is a **formula**.

If a **formula** φ does not contain \Box or \Diamond , we say it is *modal-free*.

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Bibliography