

## frd.1 Frames

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sec

**Definition frd.1.** A *frame* is a pair  $\mathfrak{F} = \langle W, R \rangle$  where  $W$  is a non-empty set of worlds and  $R$  a binary relation on  $W$ . A model  $\mathfrak{M}$  is *based on* a frame  $\mathfrak{F} = \langle W, R \rangle$  if and only if  $\mathfrak{M} = \langle W, R, V \rangle$  for some valuation  $V$ .

**Definition frd.2.** If  $\mathfrak{F}$  is a frame, we say that  $\varphi$  is *valid in*  $\mathfrak{F}$ ,  $\mathfrak{F} \vDash \varphi$ , if  $\mathfrak{M} \Vdash \varphi$  for every model  $\mathfrak{M}$  based on  $\mathfrak{F}$ .

If  $\mathcal{F}$  is a class of frames, we say  $\varphi$  is *valid in*  $\mathcal{F}$ ,  $\mathcal{F} \vDash \varphi$ , iff  $\mathfrak{F} \vDash \varphi$  for every frame  $\mathfrak{F} \in \mathcal{F}$ .

The reason frames are interesting is that correspondence between schemas and properties of the accessibility relation  $R$  is at the level of frames, *not of models*. For instance, although  $T$  is true in all reflexive models, not every model in which  $T$  is true is reflexive. However, it *is* true that not only is  $T$  *valid* on all reflexive *frames*, also every frame in which  $T$  is valid is reflexive.

*Remark 1.* Validity in a class of frames is a special case of the notion of validity in a class of models:  $\mathcal{F} \vDash \varphi$  iff  $\mathcal{C} \vDash \varphi$  where  $\mathcal{C}$  is the class of all models based on a frame in  $\mathcal{F}$ .

Obviously, if a *formula* or a schema is valid, i.e., valid with respect to the class of *all* models, it is also valid with respect to any class  $\mathcal{F}$  of frames.

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## Bibliography