

**Definition** (Uncertainty endofunctor). The *uncertainty endofunctor*  $\text{Unc} : \mathbf{DP} \rightarrow \mathbf{DP}$  is defined as follows:

1. It maps an object  $\mathbf{P}$  in  $\mathbf{DP}$  (poset) to its poset of intervals  $\mathbf{Int}(\mathbf{P})$ .
2. It maps a morphism in  $\mathbf{DP}$   $\mathbf{d} : \mathbf{F} \rightarrow \mathbf{R}$  to  $\text{Unc}(\mathbf{d})$ , where:

$$\text{Unc}(\mathbf{d}) : \mathbf{Int}(\mathbf{F})^{\text{op}} \times \mathbf{Int}(\mathbf{R}) \rightarrow_{\text{Pos}} \mathbf{Bool}$$

$$\langle [f_L, f_U]^*, [r_L, r_U] \rangle \mapsto \mathbf{d}(f_L^*, r_L) \wedge \mathbf{d}(f_U^*, r_U).$$