

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} $\mathbf{f} : \mathbf{F} \rightarrow \mathbf{R}$ to $\text{Unc}(\mathbf{f})$, where:

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

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