

**Definition** (Algebraic definition of UMCDPs). An Uncertain MCDP (UMCDP) is a tuple  $\langle \mathcal{A}, \mathbf{T}, \boldsymbol{v} \rangle$ , where  $\mathcal{A}$  is a set of atoms,  $\mathbf{T} \in \text{Terms}(\{\text{series}, \text{par}, \text{loop}\}, \mathcal{A})$  is the algebraic representation of the graph, and  $\boldsymbol{v} : \mathcal{A} \rightarrow \mathbf{UDP}$  is a valuation that assigns to each atom a UDP.