

**Definition** (Semantics of MCDP). Given an MCDP in algebraic form  $\langle \mathcal{A}, \mathbf{T}, \mathbf{v} \rangle$ , the semantics

$$\varphi[\![\langle \mathcal{A}, \mathbf{T}, \mathbf{v} \rangle]\!] \in \mathbf{DP}$$

is defined as follows:

$$\begin{aligned} \varphi[\![\langle \mathcal{A}, a, \mathbf{v} \rangle]\!] &:= \mathbf{v}(a), & \text{for all } a \in \mathcal{A}, \\ \varphi[\![\langle \mathcal{A}, \text{series}(\mathbf{T}_1, \mathbf{T}_2), \mathbf{v} \rangle]\!] &:= \varphi[\![\langle \mathcal{A}, \mathbf{T}_1, \mathbf{v} \rangle]\!] \odot \varphi[\![\langle \mathcal{A}, \mathbf{T}_2, \mathbf{v} \rangle]\!], \\ \varphi[\![\langle \mathcal{A}, \text{par}(\mathbf{T}_1, \mathbf{T}_2), \mathbf{v} \rangle]\!] &:= \varphi[\![\langle \mathcal{A}, \mathbf{T}_1, \mathbf{v} \rangle]\!] \otimes \varphi[\![\langle \mathcal{A}, \mathbf{T}_2, \mathbf{v} \rangle]\!], \\ \varphi[\![\langle \mathcal{A}, \text{loop}(\mathbf{T}), \mathbf{v} \rangle]\!] &:= \varphi[\![\langle \mathcal{A}, \mathbf{T}, \mathbf{v} \rangle]\!]^\dagger. \end{aligned}$$