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

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

is defined as follows:

$$\varphi[\![\langle \mathcal{A}, a, \boldsymbol{v} \rangle]\!] \doteq \boldsymbol{v}(a), \qquad \text{for all } a \in \mathcal{A}, \tag{0.1}$$

$$\varphi[\![\langle \mathcal{A}, \mathsf{series}(\mathsf{T}_1, \mathsf{T}_2), \boldsymbol{v} \rangle]\!] \doteq \varphi[\![\langle \mathcal{A}, \mathsf{T}_1, \boldsymbol{v} \rangle]\!] \circledcirc \varphi[\![\langle \mathcal{A}, \mathsf{T}_2, \boldsymbol{v} \rangle]\!], \tag{0.2}$$

$$\varphi[\![\langle \mathcal{A}, \mathsf{par}(\mathsf{T}_1, \mathsf{T}_2), \boldsymbol{v} \rangle]\!] \doteq \varphi[\![\langle \mathcal{A}, \mathsf{T}_1, \boldsymbol{v} \rangle]\!] \otimes \varphi[\![\langle \mathcal{A}, \mathsf{T}_2, \boldsymbol{v} \rangle]\!], \tag{0.3}$$

$$\varphi[\![\langle \mathcal{A}, \mathsf{loop}(\mathsf{T}), \boldsymbol{v} \rangle]\!] \doteq \varphi[\![\langle \mathcal{A}, \mathsf{T}, \boldsymbol{v} \rangle]\!]^{\dagger}. \tag{0.4}$$