Definition (Co-design problem with implementation)**.** A *Co-Design Problem with Implementation* (CDPI) is a tuple $\langle \mathbf{F}, \mathbf{R}, \langle \mathcal{V}, \mathcal{E} \rangle \rangle$, where $\mathbf{F}$ and $\mathbf{R}$ are two posets, and $\langle \mathcal{V}, \mathcal{E} \rangle$ is a multigraph of DPIs. Each node $\mathbf{d} \in \mathcal{V}$ is a DPI $\mathbf{d} = \langle \mathbf{F_d}, \mathbf{R_d}, \mathbf{I_d}, \mathsf{prov}_\mathbf{d}, \mathsf{req}_\mathbf{d} \rangle$. An edge $e \in \mathcal{E}$ is a tuple $e = \langle \langle \mathbf{d}_1, i_1 \rangle, \langle \mathbf{d}_2, j_2 \rangle \rangle$, where $\mathbf{d}_1, \mathbf{d}_2 \in \mathcal{V}$ are two nodes and i_1 and j_2 are the indices of the components of the functionality and resources to be connected, and it holds that $\pi_{i_1} \mathbf{R}_{\mathbf{d}_1} = \pi_{j_2} \mathbf{F}_{\mathbf{d}_2}$ (**??**).

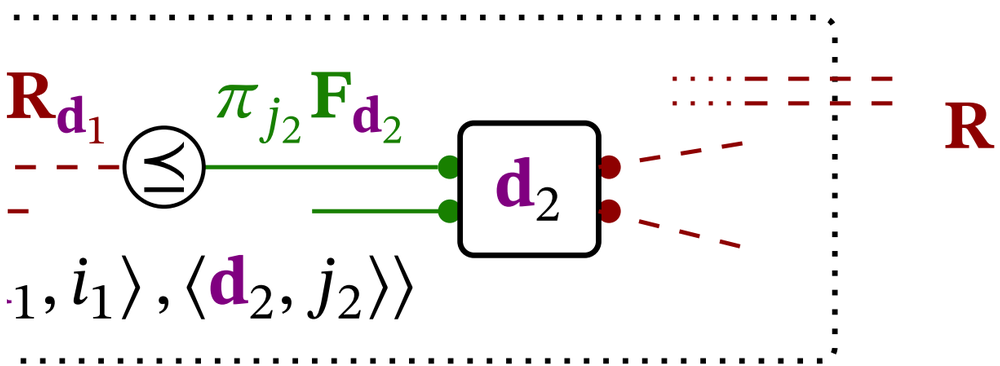

Figure 0.1