

$$\alpha\text{-VAttr} : VPG \rightarrow \mathcal{P}(\mathfrak{C} \times V) \rightarrow \mathcal{P}(\mathfrak{C} \times V)$$

$$\begin{aligned} \alpha\text{-VAttr}(G, U) = \mu A. A \cup U \\ \cup \{(c, v) \in \mathfrak{C} \times V_\alpha \mid \exists v' \in V : (c, v') \in A \wedge (v, v') \in E \wedge c \in \theta(v, v')\} \\ \cup \{(c, v) \in \mathfrak{C} \times V_{\bar{\alpha}} \mid \forall v' \in V : (v, v') \in E \wedge c \in \theta(v, v') \implies (c, v') \in A\} \end{aligned}$$

$$\begin{aligned} \setminus : VPG \rightarrow \mathcal{P}(\mathfrak{C} \times V) \rightarrow VPG \\ (V, V_0, V_1, E, \Omega, \mathfrak{C}, \theta) \setminus CV = (V', V'_0, V'_1, E', \Omega, \mathfrak{C}, \theta') \text{ such that:} \\ \theta'(u, v) = \theta(u, v) \setminus \bigcup \{c \mid (c, w) \in CV \wedge (u = w \vee v = w)\} \\ E' = \{e \in E \mid \theta'(e) \neq \emptyset\} \\ V' = \{u \in V \mid \exists (v, w) \in E' : v = u \wedge w = u\} \\ V'_0 = V_0 \cap V' \\ V'_1 = V_1 \cap V' \end{aligned}$$

Changes to the original arg: reason not about vertices but about configuration, vertex pairs. Introduce a new parameter X : exclusion set. This contains conf, vertex pairs that ought not to be considered. The reasons is that a vertex might still be in the subgame but some of the configurations are not to be considered for that vertex.

Params: $VPG\ G = (V, V_0, V_1, E, \Omega, \mathfrak{C}, \theta)$, $X \subseteq \mathfrak{C} \times V$

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1:  $m \leftarrow \min\{\Omega(v) \mid v \in V\}$ 
2:  $h \leftarrow \max\{\Omega(v) \mid v \in V\}$ 
3: if  $h = m$  or  $V = \emptyset$  then
4:   if  $h$  is even or  $V = \emptyset$  then
5:     return  $(V, \emptyset)$ 
6:   else
7:     return  $(\emptyset, V)$ 
8:   end if
9: end if
10:  $\alpha \leftarrow 0$  if  $h$  is even and 1 otherwise
11:  $U \leftarrow (\mathfrak{C} \times \{v \in V \mid \Omega(v) = h\}) \setminus X$ 
12:  $A \leftarrow \alpha\text{-VAttr}(G, U)$ 
13:  $(W'_0, W'_1) \leftarrow \text{Recursive}(G \setminus A, A \underbrace{\cup X}_?)$ 
14: if  $W'_{\bar{\alpha}} = \emptyset$  then
15:    $W_\alpha \leftarrow A \cup W'_\alpha$ 
16:    $W_{\bar{\alpha}} \leftarrow \emptyset$ 
17: else
18:    $B \leftarrow \bar{\alpha}\text{-VAttr}(G, W'_{\bar{\alpha}})$ 
19:    $(W_0, W_1) \leftarrow \text{Recursive}(G \setminus B, B \cup X)$ 
20:    $W_{\bar{\alpha}} \leftarrow W_{\bar{\alpha}} \cup B$ 
21: end if
22: return  $(W_0, W_1)$ 

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