$$\bigwedge_{\mathbf{i}\in[1..\mathbf{length}]} \bigwedge_{\mathbf{A}\in\mathbf{O}} \left(\mathbf{A_i} \Rightarrow \bigwedge_{\mathbf{f}\in\mathbf{Cond_A}} open_{\mathbf{f,i}} \right)$$

$$\bigwedge_{\mathbf{f}\in\mathbf{G}} \left(open_{\mathbf{f,length}} \vee \bigvee_{\substack{\mathbf{A}\in\mathbf{O} \\ \mathbf{f}\in\mathbf{Add_A}}} \mathbf{A_{length}} \right)$$

$$\bigwedge_{\mathbf{f}\in\mathbf{F}\backslash\mathbf{I}} \neg open_{\mathbf{f},1}$$

$$\bigwedge_{\mathbf{i}\in[2..\mathbf{length}]} \bigwedge_{\mathbf{f}\in\mathbf{F}} \left(open_{\mathbf{f,i}} \Rightarrow \left(open_{\mathbf{f,i-1}} \vee \bigvee_{\substack{\mathbf{A}\in\mathbf{O} \\ \mathbf{f}\in\mathbf{Add_A}}} \mathbf{A_{i-1}} \right) \right)$$

$$\bigwedge_{\mathbf{i}\in[2..\mathbf{length}]} \bigwedge_{\mathbf{f}\in\mathbf{F}} \left(open_{\mathbf{f,i}} \Rightarrow \bigwedge_{\substack{\mathbf{A}\in\mathbf{O} \\ \mathbf{f}\in\mathbf{Del_A}}} \neg\mathbf{A_{i-1}} \right)$$

$$\bigwedge_{\mathbf{i}\in[1..\mathbf{length}]} \bigwedge_{\mathbf{A}\in\mathbf{O}} \bigwedge_{\mathbf{f}\in(\mathbf{Add_A}\cup\mathbf{Cond_A})} \bigwedge_{\substack{\mathbf{B}\in\mathbf{O} \\ \mathbf{A}\neq\mathbf{B}\wedge\mathbf{f}\in\mathbf{Del_B}}} (\neg\mathbf{A_i} \vee \neg\mathbf{B_i})$$

$$\exists\mathbf{A}_1\,.\,\exists open_{\mathbf{f},1}\,.\,\forall b_1\,.\,\exists\mathbf{A}_0\,.\,\exists open_{\mathbf{f},0}\,.$$
$$_{\mathbf{A}\in\mathbf{O}} \qquad _{\mathbf{f}\in\mathbf{F}} \qquad\qquad _{\mathbf{A}\in\mathbf{O}} \qquad _{\mathbf{f}\in\mathbf{F}}$$

$$\bigwedge_{\mathbf{i}\in[0..\mathbf{depth}]} \bigwedge_{\mathbf{A}\in\mathbf{O}} \left(\mathbf{A_i} \Rightarrow \bigwedge_{\mathbf{f}\in\mathbf{Cond_A}} open_{\mathbf{f,i}} \right)$$

$$\wedge \left(\bigwedge_{\mathbf{i}\in[1..\mathbf{depth}]} b_{\mathbf{i}} \Rightarrow \bigwedge_{\mathbf{f}\in\mathbf{G}} \left(open_{\mathbf{f},0} \vee \bigvee_{\substack{\mathbf{A}\in\mathbf{O} \\ \mathbf{f}\in\mathbf{Add_A}}} \mathbf{A}_0 \right) \right)$$

$$\wedge \left(\bigwedge_{\mathbf{i}\in[1..\mathbf{depth}]} \neg b_{\mathbf{i}} \Rightarrow \bigwedge_{\mathbf{f}\in\mathbf{F}\backslash\mathbf{I}} \neg open_{\mathbf{f},0} \right)$$

$$\wedge \bigwedge_{\mathbf{i}\in[1..\mathbf{depth}]} \bigwedge_{\mathbf{f}\in\mathbf{F}} \left(\left(open_{\mathbf{f,i}} \wedge \neg b_{\mathbf{i}} \wedge \bigwedge_{\mathbf{j}\in[1..\mathbf{i}-1]} b_{\mathbf{j}} \right) \Rightarrow \left(open_{\mathbf{f},0} \vee \bigvee_{\substack{\mathbf{A}\in\mathbf{O} \\ \mathbf{f}\in\mathbf{Add_A}}} \mathbf{A}_0 \right) \right)$$

$$\wedge \bigwedge_{\mathbf{i}\in[1..\mathbf{depth}]} \bigwedge_{\mathbf{f}\in\mathbf{F}} \left(\left(open_{\mathbf{f},0} \wedge b_{\mathbf{i}} \wedge \bigwedge_{\mathbf{j}\in[1..\mathbf{i}-1]} \neg b_{\mathbf{j}} \right) \Rightarrow \left(open_{\mathbf{f,i}} \vee \bigvee_{\substack{\mathbf{A}\in\mathbf{O} \\ \mathbf{f}\in\mathbf{Add_A}}} \mathbf{A_i} \right) \right)$$

$$\wedge \bigwedge_{\mathbf{i}\in[1..\mathbf{depth}]} \bigwedge_{\mathbf{f}\in\mathbf{F}} \left(\left(open_{\mathbf{f,i}} \wedge \neg b_{\mathbf{i}} \wedge \bigwedge_{\mathbf{j}\in[1..\mathbf{i}-1]} b_{\mathbf{j}} \right) \Rightarrow \bigwedge_{\substack{\mathbf{A}\in\mathbf{O} \\ \mathbf{f}\in\mathbf{Del_A}}} \neg\mathbf{A}_0 \right)$$

$$\wedge \bigwedge_{\mathbf{i}\in[1..\mathbf{depth}]} \bigwedge_{\mathbf{f}\in\mathbf{F}} \left(\left(open_{\mathbf{f},0} \wedge b_{\mathbf{i}} \wedge \bigwedge_{\mathbf{j}\in[1..\mathbf{i}-1]} \neg b_{\mathbf{j}} \right) \Rightarrow \bigwedge_{\substack{\mathbf{A}\in\mathbf{O} \\ \mathbf{f}\in\mathbf{Del_A}}} \neg\mathbf{A_i} \right)$$

$$\wedge \bigwedge_{\mathbf{i}\in[0..\mathbf{depth}]} \bigwedge_{\mathbf{A}\in\mathbf{O}} \bigwedge_{\mathbf{f}\in(\mathbf{Add_A}\cup\mathbf{Cond_A})} \bigwedge_{\substack{\mathbf{B}\in\mathbf{O} \\ \mathbf{A}\neq\mathbf{B}\wedge\mathbf{f}\in\mathbf{Del_B}}} (\neg\mathbf{A_i} \vee \neg\mathbf{B_i})$$

$$\bigwedge_{i\in[1..\mathbf{length}]}\bigwedge_{\mathbf{A}\in\mathbf{O}}\left(\mathbf{A_i}\Rightarrow\bigwedge_{\mathbf{f}\in\mathbf{Cond_A}}\begin{pmatrix}open_{\mathbf{f,i}}\\\wedge\left(\tau(\mathbf{f}\mid\rightarrow\mathbf{A_i})\geq\tau_s(open_{\mathbf{f,i}})\right)\\\wedge\left(\tau(\mathbf{f}\mid\rightarrow\mathbf{A_i})\leq\tau_e(open_{\mathbf{f,i}})\right)\end{pmatrix}\right)$$

$$\bigwedge_{\mathbf{f}\in\mathbf{G}}\left(open_{\mathbf{f,length}}\vee\bigvee_{\substack{\mathbf{A}\in\mathbf{O}\\\mathbf{f}\in\mathbf{Add_A}}}\begin{pmatrix}\mathbf{A_{length}}\\\wedge\left(\tau(\mathbf{A_{length}}\mid\rightarrow\mathbf{f})=\tau_s(open_{\mathbf{f,length}})\right)\\\wedge\left(\tau_{Goal}=\tau_e(open_{\mathbf{f,length}})\right)\end{pmatrix}\right)$$

$$\bigwedge_{\mathbf{f}\in\mathbf{F}\setminus\mathbf{I}}\neg open_{\mathbf{f,1}}$$

$$\bigwedge_{\mathbf{f}\in\mathbf{I}}\left(open_{\mathbf{f,1}}\Rightarrow(\tau_{Init}=\tau_s(open_{\mathbf{f,1}}))\right)$$

$$\bigwedge_{i\in[2..\mathbf{length}]}\bigwedge_{\mathbf{f}\in\mathbf{F}}\left(open_{\mathbf{f,i}}\Rightarrow\begin{pmatrix}(open_{\mathbf{f,i-1}}\wedge(\tau_s(open_{\mathbf{f,i-1}})=\tau_s(open_{\mathbf{f,i}}))\wedge(\tau_e(open_{\mathbf{f,i-1}})=\tau_e(open_{\mathbf{f,i}})))\\\vee\bigvee_{\substack{\mathbf{A}\in\mathbf{O}\\\mathbf{f}\in\mathbf{Add_A}}}(\mathbf{A_{i-1}}\wedge(\tau(\mathbf{A_{i-1}}\mid\rightarrow\mathbf{f})=\tau_s(open_{\mathbf{f,i}})))\end{pmatrix}\right)$$

$$\bigwedge_{i\in[1..\mathbf{length}]}\bigwedge_{j\in[1..\mathbf{length}]}\bigwedge_{\mathbf{f}\in\mathbf{F}}\bigwedge_{\substack{\mathbf{A}\in\mathbf{O}\\\mathbf{f}\in\mathbf{Del_A}}}\left((open_{\mathbf{f,i}}\wedge\mathbf{A_j})\Rightarrow\begin{pmatrix}(\tau(\mathbf{A_j}\rightarrow\mid\neg\mathbf{f})<\tau_s(open_{\mathbf{f,i}}))\\\vee(\tau_e(open_{\mathbf{f,i}})<\tau(\mathbf{A_j}\mid\rightarrow\neg\mathbf{f}))\end{pmatrix}\right)$$

$$\bigwedge_{i\in[1..\mathbf{length}]}\bigwedge_{j\in[1..\mathbf{length}]}\bigwedge_{\mathbf{A}\in\mathbf{O}}\bigwedge_{\mathbf{f}\in\mathbf{Add_A}}\bigwedge_{\substack{\mathbf{B}\in\mathbf{O}\\((\mathbf{i}\neq\mathbf{j})\vee(\mathbf{A}\neq\mathbf{B}))\wedge\mathbf{f}\in\mathbf{Del_B}}}\left((\mathbf{A_i}\wedge\mathbf{B_j})\Rightarrow\begin{pmatrix}(\tau(\mathbf{A_i}\rightarrow\mid\mathbf{f})<\tau(\mathbf{B_j}\mid\rightarrow\neg\mathbf{f}))\\\vee(\tau(\mathbf{B_j}\rightarrow\mid\neg\mathbf{f})<\tau(\mathbf{A_i}\mid\rightarrow\mathbf{f}))\end{pmatrix}\right)$$

$$\bigwedge_{i\in[1..\mathbf{length}]}\bigwedge_{j\in[1..\mathbf{length}]}\bigwedge_{\mathbf{A}\in\mathbf{O}}\bigwedge_{\mathbf{f}\in\mathbf{Cond_A}}\bigwedge_{\substack{\mathbf{B}\in\mathbf{O}\\((\mathbf{i}\neq\mathbf{j})\vee(\mathbf{A}\neq\mathbf{B}))\wedge\mathbf{f}\in\mathbf{Del_B}}}\left((\mathbf{A_i}\wedge\mathbf{B_j})\Rightarrow\begin{pmatrix}(\tau(\mathbf{f}\rightarrow\mid\mathbf{A_i})<\tau(\mathbf{B_j}\mid\rightarrow\neg\mathbf{f}))\\\vee(\tau(\mathbf{B_j}\rightarrow\mid\neg\mathbf{f})<\tau(\mathbf{f}\mid\rightarrow\mathbf{A_i}))\end{pmatrix}\right)$$

$$\bigwedge_{i\in[1..\mathbf{length}]}\bigwedge_{\mathbf{A}\in\mathbf{O}}\left(\mathbf{A_i}\Rightarrow\begin{pmatrix}\bigwedge_{\mathbf{f}\in\mathbf{Cond_A}}\left((\tau_{Init}\leq\tau(\mathbf{f}\mid\rightarrow\mathbf{A_i}))\wedge(\tau_{Goal}\geq\tau(\mathbf{f}\rightarrow\mid\mathbf{A_i}))\right)\\\wedge\bigwedge_{\mathbf{f}\in\mathbf{Add_A}}\left((\tau_{Init}\leq\tau(\mathbf{A_i}\mid\rightarrow\mathbf{f}))\wedge(\tau_{Goal}\geq\tau(\mathbf{A_i}\rightarrow\mid\mathbf{f}))\right)\\\wedge\bigwedge_{\mathbf{f}\in\mathbf{Del_A}}\left((\tau_{Init}\leq\tau(\mathbf{A_i}\mid\rightarrow\neg\mathbf{f}))\wedge(\tau_{Goal}\geq\tau(\mathbf{A_i}\rightarrow\mid\neg\mathbf{f}))\right)\end{pmatrix}\right)$$

$$\bigwedge_{i\in[1..\mathbf{length}]}\bigwedge_{\mathbf{A}\in\mathbf{O}}(\neg\mathbf{A_i}\Rightarrow(t_{\mathbf{A,i}}=-1))$$