

$$\begin{aligned}
& \stackrel{X}{x} \in \\
& \stackrel{X}{\mathcal{G}_x} \\
& \stackrel{\{x\}}{\forall U} \in \\
& \stackrel{U}{\mathcal{G}_x}, \stackrel{x}{\in} \\
& \stackrel{T}{\{U \in \wp(X) \mid \forall x \in U, U \in \mathcal{G}_x\}}. \\
& \stackrel{\{, X\}}{T} \subseteq \\
& \stackrel{(U_1, U_2)}{T^2} \in \\
& \stackrel{U_1 \cap}{U_2} \\
& \stackrel{U_2}{T^2} \in \\
& \stackrel{(U_i)_{i \in I}}{T^I} \in \\
& \stackrel{\bigcup_{i \in I} U_i}{T} \in \\
& \stackrel{\forall x \in}{X, \mathcal{B}_x} = \\
& \stackrel{\{U\}}{T} \\
& \stackrel{x \in}{U} \\
& \stackrel{U}{\mathcal{G}_x} \\
& \stackrel{\mathcal{G}_x}{\forall U \in \mathcal{G}_x, \exists V \in \mathcal{G}_x, V \subseteq U \text{ and } \forall y \in V, V \in \mathcal{G}_y}. \\
& \stackrel{\in}{T, X \in} \\
& \stackrel{\bigcap_{x \in X} \mathcal{G}_x}{\forall x \in} \\
& \stackrel{U_1 \cap}{U_2} \\
& \stackrel{U_2, U_1 \in}{\mathcal{G}_x, U_2 \in} \\
& \stackrel{\mathcal{G}_x}{U_1 \cap} \\
& \stackrel{U_2 \in}{U_2} \\
& \stackrel{\mathcal{G}_x}{U} = \\
& \stackrel{\bigcup_{i \in I} U_i}{\forall x \in} \\
& \stackrel{U, \exists i \in}{I, x \in} \\
& \stackrel{U_i}{U_i} \in \\
& \stackrel{\mathcal{G}_x}{U} \supseteq \\
& \stackrel{U_i}{U} \in \\
& \stackrel{\mathcal{G}_x}{\mathcal{G}_x} \\
& \stackrel{\mathcal{G}_x}{\mathcal{B}_x} \\
& \stackrel{\mathcal{B}_x}{U} \in \\
& \stackrel{\mathcal{G}_x, \exists V \in}{\mathcal{G}_x \cap} \\
& \stackrel{T}{V \subseteq} \\
& \stackrel{U}{V} \subseteq \\
& \stackrel{V}{\mathcal{B}_x} \\
& \stackrel{V}{\mathcal{G}_x} \\
& \stackrel{\mathcal{B}_x}{\mathcal{B}_x} \\
& \stackrel{X}{\text{topol-}} \\
& \stackrel{X}{\text{ogy}} \\
& \stackrel{T}{\langle \cdot, \vee \rangle}
\end{aligned}$$

$$\mathcal{B}_x := \{U \in T \mid x \in U\}.$$

$$\begin{aligned}
& \stackrel{U \in}{\mathcal{B}_x} \\
& \stackrel{x \in}{U} \\
& \stackrel{U \in}{\mathcal{G}_x} \\
& \stackrel{\mathcal{B}_x \subseteq}{\mathcal{G}_x} \\
& \stackrel{\mathcal{G}_x}{(U, V) \in} \\
& \stackrel{\mathcal{B}_x^2}{\mathcal{B}_x^2} \\
& \stackrel{U \cap}{V \in} \\
& \stackrel{T}{\mathcal{B}_x} \\
& \stackrel{x \in}{U \cap} \\
& \stackrel{V}{U \cap} \\
& \stackrel{V}{\mathcal{B}_x} \\
& \stackrel{U \in}{\mathcal{B}_x} \\
& \stackrel{\mathcal{G}_x, \exists V \in}{\mathcal{G}_x \cap} \\
& \stackrel{T}{V \subseteq} \\
& \stackrel{U}{V \subseteq} \\
& \stackrel{V}{\mathcal{B}_x} \\
& \stackrel{V}{\mathcal{G}_x} \\
& \stackrel{\mathcal{B}_x}{\mathcal{B}_x} \\
& \stackrel{X}{\text{topol-}} \\
& \stackrel{X}{\text{ogy}} \\
& \stackrel{T}{\langle \cdot, \vee \rangle}
\end{aligned}$$