X
$x \in$
X
$\mathcal{G}_x$
$\{x\}$
$\forall U \in$
$\mathcal{G}_x, x \in$
U
T
$\{U \in \wp(X) \mid \forall x \in U, U \in \mathcal{G}_x\}.$

$\{, X\} \subseteq$
T
$(U_1, U_2) \in$
T^2
$U_1 \cap$
$U_2 \in$
T
I
$(U_i)_{i \in I} \in$
T^I
$\bigcup_{i \in I} U_i \in$
T
$\forall x \in$
$X, \mathcal{B}_x =$
$\{U \in$
$T \mid$
$x \in$
$U\}$
$\mathcal{G}_x$
$\mathcal{G}_x$
$\forall U \in \mathcal{G}_x, \exists V \in \mathcal{G}_x, V \subseteq U and \forall y \in V, V \in \mathcal{G}_y.$

$\in$
$T, X \in$
$\bigcap_{x \in X} \mathcal{G}_x$
$\forall x \in$
$U_1 \cap$
$U_2, U_1 \in$
$\mathcal{G}_x, U_2 \in$
$\mathcal{G}_x$
$U_1 \cap$
$U_2 \in$
$\mathcal{G}_x$
$U =$
$\bigcup_{i \in I} U_i$
$\forall x \in$
$U, \exists i \in$
$I, x \in$
U_i
$U_i \in$
$\mathcal{G}_x$
$U \supseteq$
U_i
$U \in$
$\mathcal{G}_x$

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

$U \in$
$\mathcal{B}_x$
$x \in$
U
$U \in$
$\mathcal{G}_x$
$\mathcal{B}_x \subseteq$
$\mathcal{G}_x$
$(U, V) \in$
$\mathcal{B}_x^2$
$U \cap$
$V \in$
T
$x \in$
$U \cap$
V
$U \cap$
$V \in$
$\mathcal{B}_x$
$\mathcal{B}_x$
$U \in$
$\mathcal{G}_x, \exists V \in$
$\mathcal{G}_x \cap$
T
$V \subseteq$
U
$V \in$
$\mathcal{B}_x$
$\mathcal{G}_x$
$\mathcal{B}_x$
X
topol-
ogy
X
T