APPENDICES

A. GENERAL NOTIONS IN TOPOLOGY

Def: let X be some set. A topology on X is a set $\tau \subset \mathcal{P}(X)$ s.t.

1) $\forall F \subset \tau$, $\bigcup_{V \in F} V \in \tau$,
2) $\forall F \subset \tau$, $|F| \in \mathbb{N}$, $\bigcap_{V \in F} V \in \tau$

The couple (X, τ) is then a topological space

Examples: 1) For any set X, ϕ and $\mathcal{P}(X)$ are topologies on X. They are respectively the coarsest and the finest topologies possible on X.

2) If $X = \mathbb{R}^N$, set $d(x,y) = \sqrt{(x-y)\cdot(x-y)}$. Then the collection τ of sets so that

$U \in \tau \iff \forall x \in U, \exists \varepsilon > 0$ s.t. $B(x,\varepsilon) \subset U$,

where $B(x,\varepsilon) = \{y \in \mathbb{R}^N \mid d(x,y) < \varepsilon\}$ defines the usual topology on $\mathbb{R}^N$.