September 20, hour 4: Bases

September-19-10
11:16 PM

BBS: One more week.
Video: Ask.

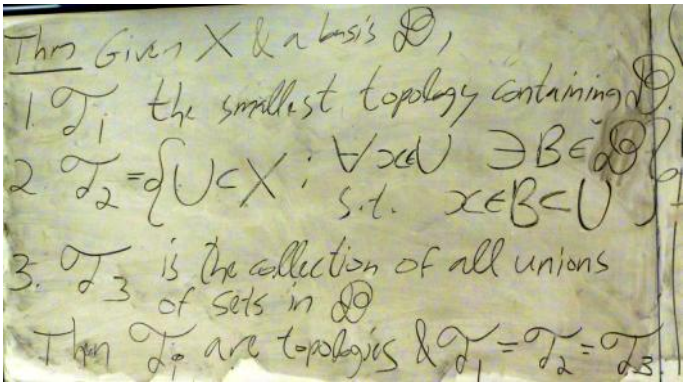
Read along: Munkres sections 12-17.

Definition A "topology" $\mathcal{T} \subset 2^X$ contains $\emptyset, X$, closed under finite intersections & arbitrary unions.

Definition $\mathcal{T}_1 \supset \mathcal{T}_2$ is "$\mathcal{T}_1$ is finer (bigger, stronger) than $\mathcal{T}_2$" while "$\mathcal{T}_2$ is coarser (smaller, weaker) than $\mathcal{T}_1$."

Definition A "basis" $\mathcal{B}$: Union is all, every intersection is a union.

Then do,



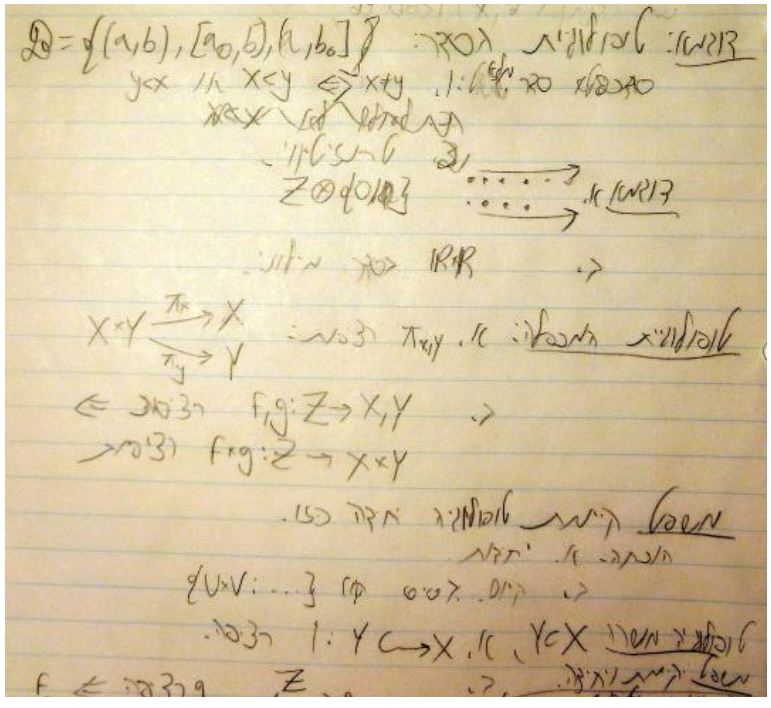
and then

Claim $\mathbb{R}_\ell = (\mathbb{R}, \mathcal{T}_{\{[a,b)\}})$ "the lower limit topology" is finer than $\mathbb{R}$ std.

done line

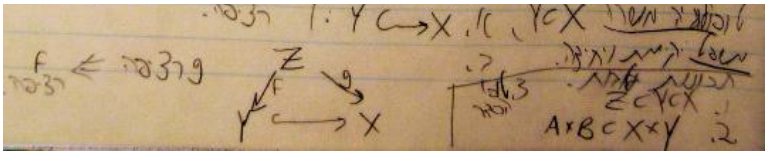
Examples/constructions of further topologies.

1. Order
2. Product
3. Subspace.
4. Compatibilities:
   - Sub & Sub
   - Sub & product
   - Sub & order, in the convex case.



Example The dictionary-

Example The dictionary-order topology on I^2 is different than the topology induced on I^2 from the dictionary order topology of $\mathbb{R}^2$



Closed set & their basics closure & interior. Condition for $x \in \overline{A}$.