MATE 4000 assignment 3

11. In general in a topological space, if A, B are arbitrary subsets, one of the sets $(A \cup B)^o$ and $\overset{o}{A} \cup \overset{o}{B}$ is always contained in the other. Show which. Give also an example where the sets are not equal.

12. Let $\mathcal{C}$ be a collection of subsets of the set E . Suppose that $\emptyset$ and E are in $\mathcal{C}$, and that finite unions and arbitrary intersections of elements of $\mathcal{C}$ are in $\mathcal{C}$. Show that the collection

$$\mathcal{T} = \{E \setminus C : C \in \mathcal{C}\}$$

is a topology on E .

13. If X is a topological space and $\mathcal{B}$ a filter base in X, show that the set of supersets of $\mathcal{B}$ (sets containing an element of $\mathcal{B}$) is a filter.

14. Problem 1, chapter II p. 129 from Dixmier.