under Graduate Homework In Mathematics

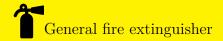**SetTheory 5**

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General fire extinguisher

PROBLEM I Prove: $F \subset \mathcal{N}$ is closed set $\iff F = [T]$ for some $T \subset {}^{<\omega}\omega$.

SOLUTION.
- $\implies$: Let $T := T_F$, now we need to prove $F = [T]$. Form the defination of T_F and $[T]$ easily we get $F \subset [T]$. Now we prove $[T] \subset F$. For $f \in [T]$, we get $f \restriction n \in T$. i.e., $\forall n \in \mathbb{N}, f \restriction n = g \restriction n$ for some $g \in F$. So $d(f, F) \leq d(f, g) = \frac{1}{2^n}$. Since F is closed, we get $f \in F$.

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$\square$