1. Show that the set of multi-indexes is countable.

2. Prove Proposition 2.1.10.

3. Prove Proposition 2.1.11.

4. Let

\[
\begin{align*}
  f(t_1, t_2, t_3) &= t_1 t_2 \sin^2 t_3, \\
  g(t_1, t_2) &= t_1 \cos^2 t_2.
\end{align*}
\]

Calculate the symmetrizations \( \tilde{f} \) and \( \tilde{g} \).

5. Give an example of a linear operator \( T : H_0 \subset H \to H' \) that cannot be extended uniquely (continuously) to the closure of the linear space \( H_0 \).