

1) Let T be the multiplication operator in $L^2(0,1)$:
 $A : x(t) \mapsto a(t)x(t)$

Can this operator be compact?

2) Let $T : X \rightarrow Y$ be a compact operator $\{x_n\}$, $x \in X$ and $x_n \xrightarrow{w} x$. Then $Tx_n \xrightarrow{s} Tx$.

3) Let $T : X \rightarrow Y$ be a compact operator.

• Then TX is separable.

4) Let $T : X \rightarrow Y$ be an invertible operator. Can it be compact.

5) Let $T : X \rightarrow Y$ be a compact operator. Can TX be closed ?