

Let $k(x, y) = x - y$, and consider the integral operator $T_k : C([0, 1]) \rightarrow C([0, 1])$ given by

$$[T_k f](x) = \int_0^1 k(x, y) f(y) dy.$$

Let $f(y) = y$, and compute $T_k f(x)$.