

Book Problems. (MacCluer) 4.6, 4.7, 4.8

Problem 1. Fix $r = (r_1, r_2, r_3, \dots) \in l^2$. Define $T : l^2 \rightarrow l^2$ by

$$Tx = (r_1x_1, r_2x_2, r_3x_3, \dots).$$

Prove that T is compact.

Problem 2. Let X be the space \mathbb{R}^3 with the l^1 norm and let Y be $C[0, 2]$ with the usual supremum norm. Define $T : X \rightarrow Y$ by

$$Tx(t) = T(x_1, x_2, x_3)(t) = x_1 + x_2t + x_3t^2.$$

Find the operator norm of T .