MATH5010 Linear Analysis (2020-21): Homework 9. Deadline: 26 Apr 2021

Important Notice:

♣ The answer paper must be submitted before the deadline.
♠ The answer paper MUST BE sent to the CU Blackboard. Please refer to the course web for details.

1. Let $T : \mathbb{C}^2 \longrightarrow \mathbb{C}^2$ be the operator defined by $T(z_1, z_2) := \frac{1}{\sqrt{2}}(z_1 + iz_2, z_1 - iz_2)$. Find T^* and show that T is a unitary operator.

2. Let $T : X_1 \to X_2$ be a bounded linear operator between Hilbert spaces X_1 and X_2. Let M_1 and M_2 be the closed subspaces of X_1 and X_2 respectively. Show that if $T(M_1) \subseteq M_2$, then $T^*(M_2^\perp) \subseteq M_1^\perp$.

$* * *$ **End** $* * *$