Statistics-III – Assignment 3

1. Let $y_1 = \theta + \epsilon_1$, $y_2 = 2\theta - \phi + \epsilon_2$, $y_3 = \theta + 2\phi + \epsilon_3$, where $E(\epsilon_i) = 0$, for $i = 1, 2, 3$. Find the least squares estimates of θ and ϕ.

2. If $P = X(X'X)^{-1}X'$, show that the column spaces of P and X are the same.

3. Prove the following statements.
(a) $B'B = 0$ iff $B = 0$.
(b) $LB'B = MB'B$ iff $LB' = MB'$.