

Supplementary homework problems for HW 8.

1. (a) Is $X = \{a_0 + a_1x + a_2x^2 \in P_2 \mid a_0 = 0\}$ a subspace of P_2 ?
(b) Is $Y = \{a_0 + a_1x + a_2x^2 \in P_2 \mid a_0 + a_1 + a_2 = 0\}$ a subspace of P_2 ?
(c) Is $Z = \{a_0 + a_1x + a_2x^2 \in P_2 \mid a_0, a_1 \text{ and } a_2 \text{ are integers}\}$ a subspace of P_2 ?
2. Recall the set of continuous functions on the closed interval $[0, 1]$ to \mathbb{R} forms a vector space with vector addition defined as function addition and scalar multiplication defined as scalar multiplication of functions. We denoted this set as $C[0, 1]$.

Show that the set:

$$V = \left\{ f \in C[0, 1] \mid \int_0^1 f(x)dx = 0 \right\}$$

is a subspace of $C[0, 1]$.

3. Show that the set:

$$W = \left\{ f \in C[0, 1] \mid \int_0^1 f(x)dx = 1 \right\}$$

is not a subspace of $C[0, 1]$.