

Assignment #3: Supplementary Problem

Problem S1: Let Y denote the following subset of \mathbb{R}^2 , with the subspace topology:

$$Y = \{(x, y) : x > 0, y \geq 0\}.$$

For each of the following subsets of Y , answer each of the following questions (no proofs necessary):

- (i) Is it open in Y ?
 - (ii) Is it open in \mathbb{R}^2 ?
 - (iii) Is it closed in Y ?
 - (iv) Is it closed in \mathbb{R}^2 ?
-
- (a) $A = \{(x, y) \in Y : y > 0\}$.
 - (b) $B = \{(x, y) \in Y : y = 0\}$.
 - (c) $C = \{(x, y) \in Y : x = 1\}$.
 - (d) $D = \{(x, y) \in Y : x^2 + y^2 \leq 1\}$.
 - (e) $E = \{(1/n, 0) : n \in \mathbb{Z}_+\}$.
 - (f) $F = \{(n, 0) : n \in \mathbb{Z}_+\}$.
 - (g) $G = \{(x, 0) : x \in \mathbb{R}, x > 0\}$.
 - (h) $H = \{(x, 0) : x \in \mathbb{R}, x \geq 1\}$.