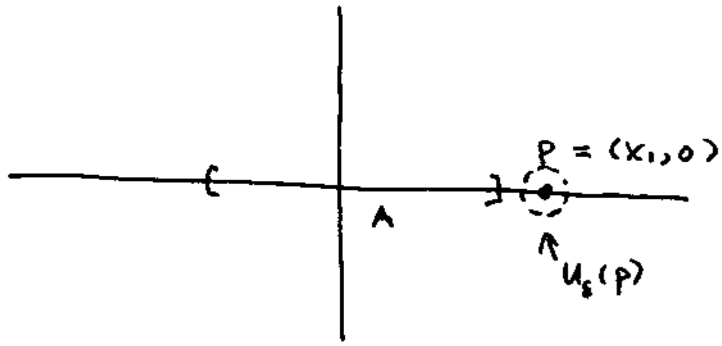
- If $y_1 = 0$ then x_1 is in the complement of A in $\mathbb{R}^1$

i.e.



Since A is closed in $\mathbb{R}^1$, there is an open ball around x_1 in $\mathbb{R}^1$, $U_\varepsilon(x_1)$, such that $U_\varepsilon(x_1) \subset A^c \subset \mathbb{R}^1$

Let's use the ball of the same radius around p in $\mathbb{R}^2$. This lies in the complement of A in $\mathbb{R}^2$.

- So, in either case we have a ball around p in $A^c \subset \mathbb{R}^2$. Hence, A is also closed as a subset of $\mathbb{R}^2$.

(5) Let $h: X \to Y$ be a homeomorphism.

Let U be open in X.

The map $h^{-1}: Y \to X$ is continuous so (by the topological def^{n} of continuity)

$(h^{-1})^{-1}(U)$ is open.

But $(h^{-1})^{-1} = h$ so $h(U)$ is open.

$\mathbb{Z}$