Morales

MA 538

Fall 2021

HOMEWORK 7

19. Let $K = \{(t, t/n) : t \in [0,1] \wedge n \in \mathbb{N}\} \cup \{(t,0) : t \in [1/2, 1]\}$ in $\mathbb{R}^2$. Show :

    1. K is connected

    2. K is not path-connected

20. Show that the function $f : [0, \infty) \to \mathbb{R}$ defined by $f(x) = \sqrt{x}$ is uniformly continuous on $[0, \infty)$

21. Let $f : (X, d) \to (X, \rho)$ be a homeomorphism. Define

$$d^* : X \times X \to \mathbb{R} \text{ by } d^*(x, y) = \rho(f(x), f(y)).$$

    Prove that d^* is a metric on X which is equivalent to d.

DUE : October 19, 2021