Assignment 9

Jiaqi Wang

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1 Exercise 12.4.4

Problem Let (X, dist) be a metric space and let $K \subseteq X$ be a compact subset. Let $a : \mathbb{N} \to X$ be a sequence with values in X, such that

[label=(*)] for all $N \in \mathbb{N}$,
there exists $\ell \geq N$,
$a_\ell \in K$

1. Use $(*)$ to indeuctively define an indeex sequence $n : \mathbb{N} to \mathbb{N}$ such that for every $k \in \mathbb{N}$, $a_{n_k} \in K$.
2. Use the fact that K is compact to show that there is a point $p \in K$ and a subsequence of $a : \mathbb{N} \to X$ converging to p.

Proof. □

2 Exercise 12.4.5

Problem

Proof. □

3 Exercise 13.11.1

Problem

Proof. □

4 Exercise 13.11.2

Problem

Proof. □