Dynamical Systems: Homework 2

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Problem 1.

We have,

$$\Sigma = \Sigma_b = \{X = (x_k)_{k=-\infty}^{\infty} : x_k \in \{0, \cdots, b-1\}\}$$

and,

$$d(x,y) = d_\theta(x,y) = \begin{cases} 0 & \text{if} \quad \text{x} = \text{y} \\ \theta^{\min\{|k| : x_k \neq y_k\}} \end{cases}$$

where $0 < \theta < 1$.

Need to show that (Σ, d) is compact.

Recall that a metric space (X, d) is compact if every open cover of X has a finite subcover.