

Marta Lewicka, Math 5535, Winter 2005

The Last Homework (no 13)

1. Show that the shift map $\sigma : \Sigma_2 \rightarrow \Sigma_2$ is a homeomorphism. Is $\sigma : \Sigma_2^+ \rightarrow \Sigma_2^+$ a homeomorphism as well?
2. Elaydi problem 7 page 212.
3. Elaydi problem 9 page 212.
4. Elaydi problem 11 page 212.
5. Elaydi problem 1 page 219.
6. Let \mathcal{H} be the set of all closed and bounded subsets of \mathbf{R}^2 . For each $A, B \in \mathcal{H}$, define:

$$d_H(A, B) := \inf \left\{ s \geq 0; A \subset \mathcal{O}_s(B) \text{ and } B \subset \mathcal{O}_s(A) \right\},$$

where for any $C \in \mathcal{H}$ one has:

$$\mathcal{O}_s(C) := \{x \in \mathbf{R}^2; \exists y \in C \text{ } \|x - y\| \leq s\}.$$

Prove that (\mathcal{H}, d_H) is a metric space.