17. Prove that, if $\mathbf{s} \in \Sigma$, there are sequences $\mathbf{t}$ arbitrarily close to $\mathbf{s}$ for which $d[\sigma^n(\mathbf{s}), \sigma^n(\mathbf{t})] = 2$ for all sufficiently large n.

Let $\mathbf{s} = (s_0 s_1 s_2 \ldots) \in \Sigma$ and consider the point

$$\mathbf{t} = (s_0 s_1 \ldots s_n \hat{s}_{n+1} \hat{s}_{n+2} \ldots).$$

By the Proximity Theorem, we know that

$$d[\mathbf{s}, \mathbf{t}] \leq \frac{1}{2^n},$$

but

$$d[\sigma^k(\mathbf{s}), \sigma^k(\mathbf{t})] = 2$$

for all $k > n$.