**Example 10.11** Let $X$ be uniformly distributed on $[0, 1)$. Then we can write

$$X = .X_1 X_2 X_3 \cdots ,$$

the dyadic expansion of $X$, where $X_1, X_2, X_3, \cdots$ is a sequence of fair bits. Then

$$\begin{aligned} H(X) &= H(X_1, X_2, X_3, \cdots) \\ &= \sum_{i=1}^{\infty} H(X_i) \\ &= \sum_{i=1}^{\infty} 1 \\ &= \infty \end{aligned}$$