

In general,  $E_{k+1}$  is constructed by removing the 1st, 3rd, 5th, 7th and 9th tenths of each interval in  $E_k$ . Thus,  $E_k$  is the union of  $5^k$  intervals, each of length  $10^{-k}$ .

Let  $E_k$  be the collection of the  $5^k$  intervals which make up  $E_k$ . For each  $k \in \mathbb{N}$ , each set  $U$  is contained in one of the sets of  $E_{k+1}$  and contains exactly 5 of the sets in  $E_{k+1}$ . The maximum diameter of the sets in  $E_k$  tends to 0 as  $k \rightarrow \infty$ .