

## 20200324 Exercise 4

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### 1

**Question 1.** Let  $(y_n)_{n \in \mathbb{N}}$  be a sequence of reals from  $[0, 1]$  such that  $\sum_{n \in \mathbb{N}} y_n = \infty$ . Show that  $\prod (1 - y_n) = 0$ .

**solution** Because  $\sum_{n \in \mathbb{N}} y_n = \infty$ , so  $\exists \epsilon > 0 \exists N \forall n > N, y_n > \epsilon$ . Then we consider when  $n > N$ ,  $\prod_N^M (1 - y_n) \leq (1 - \epsilon)^{M-N}$ . So  $\lim_{M \rightarrow \infty} \prod_N^M (1 - y_n) \leq (1 - \epsilon)^{M-N} = 0$ , which means  $\prod (1 - y_n) = 0$ .