MATH 265H, FALL 2022, HOMEWORK #3

ALEX IOSEVICH

1. Problems not in the book

Problem #1: This is to cement the ideas behind last week's first problem. Let $1 \leq m < n$. Let B be a subset of $\{0, 1, 2, \ldots, n-1\}$ of size m. Let $X_{n,B}$ be the subset of the positive integers such that the numbers in B are missing from their base n representations. Find α such that

$$\sum_{k \in X_{n,B}} \frac{1}{k^{\beta}} < \infty \text{ if } \beta > \alpha,$$

and $\sum_{k=1}^{\infty} \frac{1}{k^{\alpha}}$ diverges for $\beta \leq \alpha$. Does such α depend on the structure of B or only its size?

2. Problems from the book

Chapter 2: 11,12,13,14,16,17,18