

Math 3210-3

HW 14

Due Friday, October 19, 2007

Subsequences

1. For each sequence, find the set S of subsequential limits, the \limsup , and the \liminf . No proofs are needed.

(a) $w_n = \frac{(-1)^n}{n}$

(b) $(x_n) = (0, 1, 2, 0, 1, 3, 0, 1, 4, \dots)$

(c) $y_n = n[2 + (-1)^n]$

(d) $z_n = (-n)^n$

(e) $b_n = \sin\left(\frac{n\pi}{3}\right)$

2. If $\limsup a_n$ and $\limsup b_n$ are finite, prove that $\limsup(a_n + b_n) \leq \limsup a_n + \limsup b_n$.
3. Let (r_n) be an enumeration of the set \mathbb{Q} . Show that there exists a subsequence (r_{n_k}) such that $\lim_{k \rightarrow \infty} r_{n_k} = +\infty$.