

MATH 311: Homework 5

Due: February 24, 2021

1. Upcoming office hours are Monday February 22 3:30-4:30 and Wednesday February 24 9:00-10:00
2. Read Section 2.7 in Abbott. You may also wish to skim Section 2.8, as we'll do one of the proofs from it in class.
3. For each of the sequences below, what is the set of subsequential limits? (You don't have to prove your answer, just state it.)
 - (a) $a_n = 3 + 2(-1)^n$
 - (b) $b_n = \sin(\frac{n\pi}{3})$
 - (c) $c_n = n \cos(\frac{n\pi}{4})$
 - (d) $d_n = (1, \frac{1}{2}, 1, \frac{1}{3}, \frac{1}{2}, 1, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, 1, \dots)$
 - (e) (r_n) the enumeration of the rationals constructed in class.
4. Do Abbott Exercises 2.5.2, 2.5.5, 2.5.6, 2.6.2, 2.6.4
5. Let a_n be a sequence with the property that $|a_n - a_{n+1}| < \frac{1}{2^n}$. Prove that (a_n) is Cauchy. Does this result stay true if $\frac{1}{2^n}$ is replaced with $\frac{1}{n}$?