
Analysis I Chapter 5 Exercises

Vladimir Guevara-Gonzalez

March 11, 2019

5.1 Cauchy Sequences

5.1.1 Let a_n be a cauchy sequence. By definition a_n is 1-steady, hence $\exists N$ such that $\forall i, j \geq N$ $|a_i - a_j| \leq 1$. If we fix j then from the reverse triangle inequality we obtain $|a_i| - |a_j| \leq 1$ which implies $|a_i| \leq 1 + |a_j|$, which shows a_i is bounded by $1 + |a_j| \forall i \geq N$. Consider all the terms before the index N of a_n , these make up a finite sequence which is bounded by $x = \max(\{a_k | k < N\})$. Let $M = \max(x, 1 + |a_j|)$ then $a_n \leq M \forall n$.

5.2 Equivalent Cauchy Sequences

5.2.1

5.3 The Construction of The Real Numbers

5.3.1

5.4 Ordering The Real Numbers

5.4.1

5.5 The Least Upper Bound Property

5.5.1

5.6 Real Exponentiation Part I

5.6.1