Real Analysis - HW 3

September 21, 2015

This third homework for real analysis is due this coming Friday, September 25 by 3:00 PM. It's essentially Exercise 2.4.5 in the text You should type it with LaTeX and turn in your printed PDF.

1. Let $x_1 = 2$ and define
$$x_{n+1} = \frac{1}{2}\left(x_n + 2/x_n\right).$$
   (a) Show that $x_n^2 > 2$ for all $n \in \mathbb{N}$.
   (b) Show that $x_n - x_{n+1} > 0$ for all $n \in \mathbb{N}$.
   (c) Conclude that $\lim x_n = \sqrt{2}$.