Assignment 2

August 29, 2023

1. Using the definition prove that $\lim_{n\to\infty} \frac{b}{n^2} = 0$ for any real number b.
2. Prove that $\lim_{n\to\infty}(\sqrt{n+1} - \sqrt{n}) = 0$.
3. If $\lim_{n\to\infty} x_n = x > 0$, show that there exists a natural number k such that if $n \geq k$, then $\frac{x}{2} < x_n < 2x$.
4. Using the definition prove that $\lim_{n\to\infty} \frac{n}{n+1} = 1$.
5. Show that the sequence $(-1)^n n^2$ does not converge (oscillatory).

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