Introduction to Analysis
Home Work 6, due FRIDAY, October 21.
Instructor: Prof. Artem Zvavitch

Problem 1. *Let*

$$a_n = \frac{n}{n^2 + \cos n}, \text{ for } n \in N.$$

Prove that a_n is a convergent sequence.

Problem 2. *Consider sequence (a_n) such that $a_n^2 \leq \frac{1}{2^n}$. Show that (a_n) is a convergent sequence. Find $\lim_{n\to\infty} a_n$*

Problem 3. *Let $a_1 = 1$ and*

$$a_n = 1 + \frac{1}{2!} + \cdots + \frac{1}{n!}, \text{ for } n \in N.$$

Show that a_n is a convergent sequence.

Problem 4. *Consider an increasing sequence (a_n). Assume that*

$$a_{n+1} - a_n \leq \frac{1}{3^n}, \text{ for } n \in N.$$

Show that a_n is a convergent sequence.