

# Homework

Miklós Abért

due February 19

**Exercise 1** *Is there a continuous real function  $f : \mathbb{R} \rightarrow \mathbb{R}$  that takes on every real number an even number of times?*

**Exercise 2**  $\sum_{n=1}^{\infty} \frac{1}{n(n+1)} = 1$ .

**Exercise 3**  $\sum_{n=1}^{\infty} \frac{1}{n^2}$  is convergent.

Actually, its value is  $\pi^2/6$ .

**Exercise 4**  $\sum_{n=1}^{\infty} \frac{1}{n^3}$  is convergent.

Not much is known about its value, except that it is not a rational number.

**Exercise 5** *A frog takes off his slippers and starts to jump around on the plane. At every step, he jumps twice as far as his last jump (he chooses direction). What is the minimal number of jumps that can get him back to his slippers?*