## 1.1 Basic Concepts

In this section, we will first introduce some basic mathematical terms and symbols that

lowing sets of numbers. A set is a collection of values. With the symbol ℕ we designate the are important for further understanding of this script. Please learn the following symbols and their meaning, as they are used throughout this script! This is how we define the folnatural numbers. By this we mean all positive integers, that is, 1, 2, 3, 4, 5, 6, .... You With the symbol ℕℤ0 we designate the natural numbers including the zero, i.e., 0, 1, 2, 3, .... already know from school that there are an infinite number of these.

With the symbol we denote the integers. By this we mean all negative integers, all posiWith the symbol ℚ we denote the rational numbers. By this we mean all numbers that can tive integers, and zero, so: ..., −3, −2, −1, 0, 1, 2, 3, ...

be represented as a fractionp pq q

where is an positive or negative integer including zero and is an positive or negative integer.

With the symbol ℝ we denote the real numbers. This includes all numbers mentioned so With the symbol ℝ+ we denote the non-negative real numbers, i.e., all real numbers that far, i.e., both integers and all numbers with decimal places. are greater than or equal to zero.

chosen freely. Often lowercase letters such as x, y, z, i, or j are used, but uppercase letters In mathematics as well as in computer science one often works with variables. These are placeholders that can take certain values. The name of these variables can usually be

or identifiers with more than one character are also possible. Often letters from the Greek alphabet are also used. Since we will follow this tradition in this script, the following table summarizes all letters of the Greek alphabet.

Table 1: The Greek Alphabet