Problem Set 1

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1 Introduction

Hello! My name is Dario Loprete, and I am from Italy. I completed my BSc and MSc at the University of Rome La Sapienza. During my master's program, I focused on theoretical particle physics. My master's thesis regarded topics in particle phenomenology and cosmology and it involved the use of Python codes to perform computations related to neutrino physics in the early universe. I have also used C++ in various courses and labs. Currently, I envision continuing my academic career after completing my PhD, although I am open to other opportunities as well. My main goal in this course is to enhance my coding skills and learn techniques that are valuable in research.

My GitHub account is the following: dariolop76

2 Methods

For the purpose of plotting the Gaussian function in Eq. 1 using Python, the packages `matplotlib` and `numpy` were imported. A function called **gauss** was declared, with arguments x, $mean$ $(\bar{x})$ and $sigma$ (σ), being respectively the point at which the function is evaluated, the mean and the standard deviation of the Gaussian.

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\left(\frac{x-\bar{x}}{\sigma}\right)^2} \tag{1}$$

The sample of points was created using the function `numpy.linspace` in the range $[-10, 10]$. The dimensionality of the sample was chosen to be 200, which is sufficient to accurately represent the Gaussian function.

Finally, the plot was drawn using the module `pyplot` from `matplotlib`. The graph was then saved as a *png* image.

3 Results

Figure 1 shows the plot of the Gaussian function obtained using Python. The mean and the standard deviation were set to, respectively, $\bar{x} = 0$ and $\sigma = 3$.
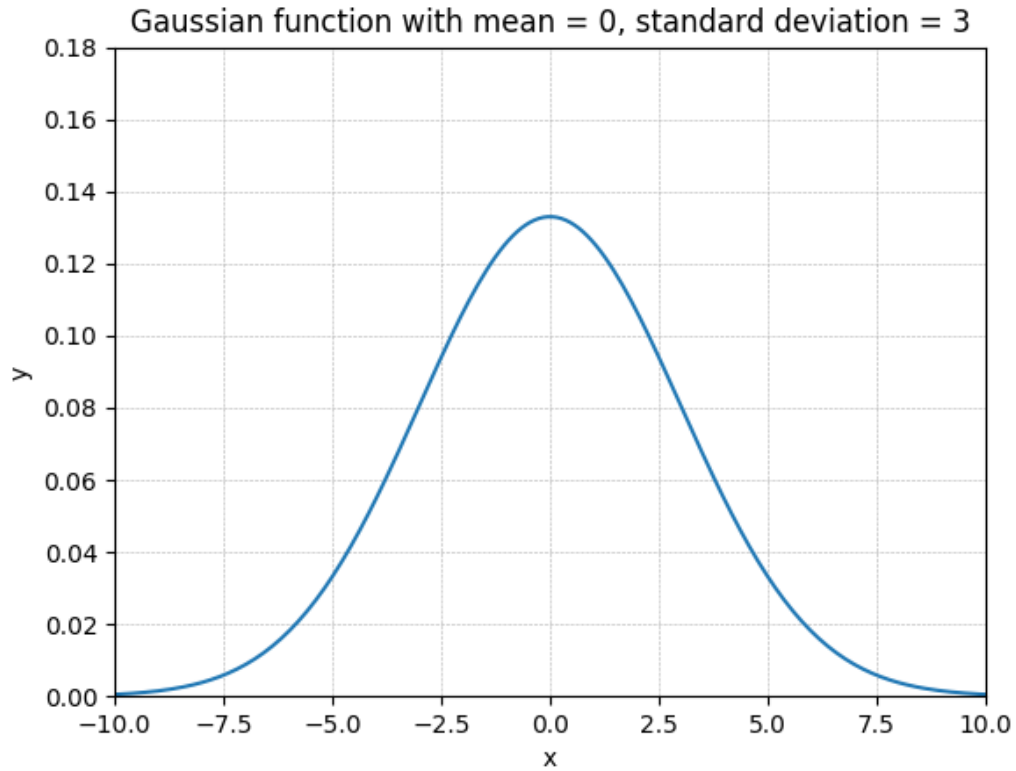

Figure 1: Gaussian function with mean $\bar{x} = 0$ and standard deviation $\sigma = 3$.