Chapter 0

Introduction

0.1 We will study geometry as it is used in physics.

0.2 Mathematics is the most exact possible thought.

0.3 Physics is the most exact description of nature; the laws of physics are expressed in terms of mathematics.

0.4 The oldest branch of mathematics is geometry; its earliest scientific use was in astronomy.

0.5 Geometry was formulated axiomatically by Euclid in his **Elements**.

0.6 Newton used that as a model in his **Principia** to formulate the laws of mechanics. Newton proved most of his results using geometric methods.

0.7 Einstein showed that gravity can be understood as the curvature of the geometry of space-time.

0.8 The other forces of nature (the electromagnetic, weak and strong forces) are also explained in terms of the geometry of connections on fibre bundles.

0.9 We dont yet have a unified theory of all forces; all attempts to construct such a theory are based on geometric ideas.

0.10 No one ignorant of geometry can be a physicist.