

The first part of this thesis deals with Cantor's bijection and the historical development of the notion of curve. Here, the proof of existence of Cantor's bijection is introduced and it is followed by a discussion of the importance of this bijection for further advancement of mathematics and the theme of space-filling curves. The section about historical development of curves explores different approaches to the definition and its changing interpretation through time, from the Ancient Greece up until the 20th century. The second part of the thesis introduces the issue of space-filling curves. The segment describes different methods of space-filling curves construction, particularly the geometric and the arithmetic construction of the Hilbert and the Peano Curve, as these were the first examples of the said curve. Furthermore, typical properties of the space-filling curves are discussed, explained and proofed with special attention dedicated to their nowhere differentiability. There are also some additional examples of 2D space-filling curves – including the Sierpiński Curve – and some 3D variations of some of them. The illustrative figures presented throughout the text are also a crucial component of the thesis.