SPACE FILLING AND CRITICAL POINTS

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Around 1870, G. Cantor found a bijective mapping from $[0,1]$ to $[0,1]^2$. This was very surprising to him and his contemporaries. However, the construction was not very regular, and interest arose how regular these bijections can be. E. Netto showed that such bijections cannot be continuous. Research then moved on to the study of surjections, and G. Peano showed that there exist continuous surjections from $[0,1]$ to $[0,1]^2$. Recently, P. Hajlasz and J. Tyson constructed surjections with certain Sobolev regularity from the n-dimensional unit cube onto metric spaces. In this talk, we will focus on the example that motivated their construction and discuss some related results.