

Simple digital objects on \mathbb{Z}^2 *

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Abstract

The digital geometry is an important part of digital image processing. In this paper we will use the square grid (\mathbb{Z}^2) with distances based on 4-neighbourhood and on 8-neighbourhood relations. We will use the notations $(\mathbb{Z}^2, 4)$ and $(\mathbb{Z}^2, 8)$, respectively. We will use the digital distance functions based on the possible shortest path(s) between points using only the neighbourhood criteria of the plane in each step.

The purpose of this paper is to describe some simple geometrical objects of these digital planes. Our definitions are based on digital distances and some characteristic Euclidean properties of the objects.

We present some simple digital geometrical concepts both first and second order objects: the digital sections, lines, circles, parabolas, hyperbolas and ellipses are presented.

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