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ON SOME SETS IN DIGITAL TOPOLOGY

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Abstract. The notions of strong and weak forms of open sets and closed sets in the digital line and digital plane have been used in digital image filtering techniques. The purpose of this paper is to characterize such sets in Digital Topology with special reference to b-closed sets and b-open sets.

1. Introduction and preliminaries

Digital topology deals with properties and features of two-dimensional (2D) or three-dimensional (3D) digital images that correspond to topological properties (e.g., connectedness) or topological features (e.g., boundaries) of objects. Concepts and results of digital topology are used to specify and justify important (low-level) image analysis algorithms, including algorithms for thinning, border or surface tracing, counting of components or tunnels, or region-filling. Digital topology was first studied in the late 1960s by the computer image analysis researcher Azriel Rosenfeld, whose publications on the subject played a major role in establishing and developing the field. The term "digital topology" was itself invented by Rosenfeld, who used it in a 1973 publication for the first time.

The information required for a digital picture can be stored by specifying the colour at each pixel. If a digital picture is formed by simple closed curve, one can specify the pixels on the simple closed curves and then specify uniformly the colours for the insides and the outside. This method results in the reduction of computer memory usage signicantly. This method employs the celebrated Jordan curve theorem, which states that every simple closed curve in the plane separates the plane into two connected components.

Kong and Kopperman [13] gave a topological approach to digital topology. Kong et al. [14] studied the digital fundamental group and also established that on a strongly normal digital picture space, the discrete and continuous concepts are equivalent. Maki et al. [16] investigated the digital line and operations approaches of $T_{\frac{1}{2}}$ spaces. Devi et al. [5] studied the topological properties of wgp-closed sets in the digital plane. Saha et al. [20] investigated that the basic parts of digital geometry can be generalized into sets of convex voxels. Thangavelu [22] discussed

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