

Two-dimensional Oxide Picture Languages

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Abstract. In the theory of formal languages, two-dimensional (picture) languages are a generalization of string languages to two dimensions. Pictures may be regarded as digitized finite arrays occur in the studies concerning pattern recognition, image analysis, cellular automata and parallel computing. Several studies have been done for generating and (or) recognizing rectangular, triangular and hexagonal arrays using the formal syntactic methods. Motivated by oxide molecular structures, the oxide pictures, a special class of two-dimensional pictures is considered. Various generating and recognizing schemes such as Oxide Tiling System, Oxide Wang System, Oxide Tile Rewriting Grammar and Oxide Sgraffito Automata have been developed recently. This paper discusses certain unary operations such as turns and binary operations such as union, overlapping performed on this special class of picture languages. We also aim to connect with AI related image processing methods.

Keywords: two-dimensional languages, oxide pictures, oxide tiles