INTERPRETATION OF MATHEMATICAL OBJECTS IN THE SHAPE UNDERSTANDING SYSTEM

Zbigniew Les and Magdalena Les
St. Queen Jadwiga Research Institute of Understanding, Australia

Abstract

This paper presents the method of understanding of visual objects that can be considered as mathematical objects. A mathematical object is a visual object such as a curve or coordinate system that is defined in the area of mathematics. The proposed method of understanding of mathematical objects is part of the shape understanding method. The main novelty of proposed method is that it relates a concept of a visual object to the sub-symbolic representation given in the form of symbolic names of possible classes of shapes. A visual object is interpreted as a mathematical object based on a visual inference. In this research the visual inference is applied to solve the problem of curve identification, graphical investigation of characteristic points of the curve, interpreting a model of visual processes and visual diagnosis, graphical explanation, visual tests and identification of statistical visual objects. The visual tests containing mathematical concepts and mathematical objects are formulated as a sequence of tasks given to the system. Performance of the SUS was compared with the human performance of these tasks. The results show that the SUS is able to perform visual tasks that are performed by the human observer during intelligence test. The research has shown that the system of shape understanding is able to understand non-trivial mathematical concepts and solve tasks that are part of a student examination and assessment.