ABSTRACT

This bachelor thesis deals with solving planar geometric problems in slightly unusual way, by solving it with the use of spatial interpretation. Various geometric solids are used for spatial solutions. The thesis is divided into two main parts. The first chapter deals with prismatic and pyramidal surfaces and solids and is further subdivided into corresponding parts. The subchapter about the prisms discusses an axial affinity between two planes, which is applied to the following proof of Pohlke's theorem. Constructions with special types of prisms are used in spatial visualizations. In the subchapter about the pyramid we describe a central collineation, that is subsequently used in the Desargues's theorem. Further on, some constructions and analogies are also presented. The second part of the thesis is focused on the use of quadrics in spatial solutions – particularly we consider a cone, a cylinder, a sphere and a paraboloid. The theorem of Quételet-Dandelin, Monge's theorem, cyclic quadrilateral or cyclographic solution of the Apollonius' problem are presented in the subchapter about the cone and the cylinder. The Apollonius' problem is subsequently solved in next subchapters with the use of stereographic projection on the sphere and by using the properties of a rotary paraboloid. The entire thesis is supplemented with illustrative figures, all of them were created in the program GeoGebra.

KEYWORDS

Prismatic and pyramidal surfaces and solids, quadrics, spatial solution, planar geometric problems