

This bachelor thesis deals with the introduction of scalar product and determinant, which are important tools of analytic geometry. The purpose of the thesis is to provide a parallel interpretation of these two key concepts of advanced algebra - the dot product and the determinant - primarily from a geometric, not an algebraic, point of view. The aim of the thesis is to show how both representations can be derived just by solving geometric problems in two-dimensional space and then how to transfer them to three-dimensional space. The first part of the work is devoted to finding the angle between two vectors in the plane and to calculating the area of a triangle. Both of problems are solved in several ways and then the scalar product and determinant are derived. The second part of the work is devoted to three-dimensional space, in particular the angle between two vectors, lines and planes and the volume of a tetrahedron and parallelogram. This is then supplemented by the introduction of some notions of linear algebra, an investigation of the algebraic properties of the dot product and determinant, and a generalization of the notions to the n -dimensional space. The last part of the thesis is devoted to the analysis of selected czech high school mathematics textbooks in terms of the occurrence and interpretation of the dot product and determinant. All problems are accompanied by pictures created in GeoGebra. The work is primarily intended for secondary school teachers and students, students of teaching mathematics or anyone else interested in analytical geometry.