ABSTRACT

The thesis is presented in 56 pages. It contains 2 appendixes, and bibliography of 17 references. Seven figures are given in the thesis.

The objective of this work is to create the rotational model which will consist of the merits, such as robustness, efficiency and easiness. Furthermore, the application of dual-quaternion model in skinning was considered too.

Throughout the research basic and widely used rotational methods have been observed. The main issues have been emphasized. The comparisons of efficiency, robustness and easiness of usage well-known mathematical methods and a brand-new one – application of quaternions have been provided. This work contemplates the most contemporary solution for the gimbal lock rotational issue in Euler angles by eliminating gimbals at all by means of Hamilton's quaternion.

Likewise, the transcendence of the cutting-edge technology – application of dual-quaternions in comparison to other interpolating methods by means of programming has been shown.

Key words: robustness, efficiency, rotational model, skinning, quaternion, dual-quaternion, cutting-edge, Euler angles, gimbals, gimbal lock.