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THE TENNIS RACKET THEOREM, ANALYSIS AND NUMERICAL SIMULATION OF THE INTERMEDIATE AXIS THEOREM

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Abstract. The aim of this paper is to reproduce the phenomenon of the intermediate axes theorem also known as the Dzhanibekov effect or the Tennis Racket effect. A RBD (Rigid Body Dynamic) model with 6DOFs (six degrees of freedom) was developed to reproduce the Euler's law of motion. Furthermore, in the RBD model, quaternions are employed for the mathematical modeling. Then an asymmetrical-top object was analyzed in order to show the intermediate axis effect. Finally, a numerical simulation is performed in order to reproduce the instability.