Bachelor thesis

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Abstract in English

This work aims to give a well-arranged summary of the description and solving the equations of motion of particles outside a black hole (a star) with emphasis on numerical solutions. For that purpose a summary of numerical methods for solving ordinary differential equations, together with a review and comparison of chosen methods, is given. In the second chapter follows a brief recall of the foundations of General Relativity as well as the description of the geometry of Schwarzschild solution of the Einstein equations. After that equations of motion are formulated. In conclusion, selected numerical methods are used on solving said equations of motion of a test particle or those describing bending of light rays in closeness to a black hole.