

# Logarithmic potential for the gravitational field of Schwarzschild black holes

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## Abstract

© 2018 The Author(s). Approximate gravitational potentials are often used to describe analytically the motion of particles near black holes (BHs), as well as to study the structure of an accretion disc. Such 'pseudo-Newtonian' potentials are used with the flat-metric equations. Here we consider the motion of a free particle near a non-rotating BH in the context of an exact 'logarithmic' gravitational potential. We show how the logarithmic potential gives an exact solution for a mechanical problem and present the relativistic Bernoulli equation for the fluid in the Schwarzschild metric.

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## Keywords

Gravitation, Stars: black holes

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