

## ON THE EQUIVALENCE BETWEEN MANEV AND KEPLER PROBLEMS

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**Abstract.** Here we demonstrate the existence of a *local* Darboux chart for the Manev model such that its dynamics becomes locally equivalent to the Kepler model. This explains lot of similarities between these two models and especially why they share common symmetry algebras. We also discuss the existence of group actions on the phase space for the algebras inherent in the Manev model.

### 1. Introduction

In the last decade Manev model had enjoyed an increased interest either as a very suitable approximation to Einstein's relativistic dynamics from astronomers' point of view or as a toy model for applying different techniques of the modern dynamics (see e.g. [4,7,8,17,18]). It was not invented as an approximation of relativity theory but as a consequence of Max Planck's (more general) action-reaction principle and is capable to describe both the perihelion advance of the inner planets and the Moon's perigee motion.

By **Manev model** [16] we mean here the dynamics given by the Hamiltonian

$$H = \frac{1}{2}(p_x^2 + p_y^2 + p_z^2) - \frac{A}{r} - \frac{B}{r^2} \quad (1)$$