PERIODIC ORBITS FOR ONE MODEL OF GALACTIC POTENTIALS

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As known the polynomial Henon-Heiles potential have been used for the description of the star motion in the meridional plane of a galactic field with rotational symmetry. In this paper the analytical method is offered to obtain some partial solutions of the motion equations in a cubic Henon-Heiles potential with two arbitrary parameters. A new class of periodic orbits is found for the fixed pairs of the parameters. The equations of these orbits have a closed analytical form. As a rule, the motions along the trajectories are described by elliptical integrals. The present study shows that the search for trajectories in closed analytical form for motion in gravitational fields with polynomial potentials is likely to be more perspective than appeared earlier.