New families of periodic solutions in Schwarzschild N-body problem

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Applying the abstract theorems presented in my talk "New periodic solutions of Lennard–Jones 2− and 3−body problems and related abstract results" I will present the sufficient conditions for the existence of new families of periodic solutions of Schwarzschild N-body problem.

We consider the potential

$$U(p) = \sum_{1 \le i < j \le N} \mathcal{U}_{ij}(r_{ij}(p)),$$

where $\mathcal{U}_{ij}(r) = \frac{A_{ij}}{r} + \frac{B_{ij}}{r^3}$ and $A_{ij} < 0 < B_{ij}$. Under some geometrical assumptions we obtain the existence of equilibrium of the problem

$$\ddot{p}(t) = -U'(p(t))$$

and the family of periodic solutions in neighborhood of the stationary one. The special cases for $N = 2$ and $N = 3$ will be considered.

This is a joint work with E. Pérez-Chavela and S. Rybicki.