

On the dynamical system generated by the three-body integrator

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We study the dynamical system generated by the numerical integrator of the three-body problem. Popular three-body code Triple by S. Aarseth is used with untypically small accuracy parameter, of the order of 10^{-16} , while recommended values are of the order of 10^{-12} . Such a small values of accuracy lead to fast accumulation of the round-off errors and strange effects: for some trajectories "quantum leaps" of energy are observed – total energy of the triple system changes tenfold, but after a while returns to original values; sometimes "travel back in time" is observed, etc. These effects are computer- and compiler- dependent and disappear if one makes all constants in use of the proper (double) precision.

Keywords

Three-body problem, Numerical integration of ODE