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Periastron advance for a spinning particle in Kerr spacetime

TANJA HINDERER, ALESSANDRA BUONANNO, University of Maryland — For a spinning particle in Kerr spacetime we calculate the periastron advance, the ratio of the azimuthal and radial frequencies for small librations around a circular equatorial orbit. The frequencies can be derived either from the fully constrained Hamiltonian or by computing Lyapunov exponents directly from the Papapetrou equations of motion. We discuss the use of different spin supplementary conditions corresponding to different reference worldlines for defining the particle's spin dipole moment. Our results will be useful for improving the modelling of binary inspirals and for comparisons with numerical simulations.

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