

Abstract Submitted
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Eccentric orbit E/IMRI gravitational wave fluxes to 7PN order
ERIK FORSETH, CHARLES R. EVANS, Univ of NC - Chapel Hill, SETH HOPPER, Instituto Superior Tcnico, Lisboa — Knowledge of gravitational wave fluxes (energy and angular momentum, at both infinity and the horizon) from eccentric-orbit inspirals is extended from 3PN to 7PN order at lowest order in small mass ratio. Previous post-Newtonian eccentric-orbit results up to 3PN relative order are confirmed by our new black hole perturbation calculations. The calculations are based on Mano, Suzuki, and Takasugi (MST) analytic function expansions, and results are computed to 200 decimal places of accuracy using Mathematica. Over 1,700 distinct orbits were computed, each with as many as 7,000 Fourier-harmonic modes. A large number of PN coefficients between 3.5PN and 7PN orders were determined, either in exact analytic form or with accurate numerical values, in expansions in powers of a PN compactness parameter and its logarithm, and powers of eccentricity. We show a parametrization that removes singularities in the fluxes as the eccentricity approaches unity, thus making the expansions more convergent at high eccentricity. We also found (nearly) arbitrarily accurate expansions for the previously discussed 1.5PN, 2.5PN, and 3PN hereditary terms.

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