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Eccentric-orbit extreme-mass-ratio inspirals: Analytically expanding black hole perturbation theory quantities to high PN order CHRISTOPHER MUNNA, CHARLES EVANS, University of North Carolina at Chapel Hill — We present new advances in determining analytic PN series for various orbital features of non-spinning extreme-mass-ratio inspirals. We pursue quantities in both the dissipative and conservative sectors using an expansion procedure for the MST solutions in the RWZ formalism. On the dissipative side, these solutions immediately yield PN series for the time-averaged fluxes using standard formulas. Because the process requires only a finite number of modes, the results can be taken to high PN order, as well as high (if not arbitrary) order in the eccentricity of the orbit. However, local conservative changes involve an infinite number of modes, increasing the computational complexity by an order of magnitude. Nevertheless, we employ several computational simplifications to advance the state of the art for the redshift invariant. We conclude by discussing the spin precession invariant and local self-force, as well as future application to the more complicated case where the central black hole has spin.

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