

Time Domain Method for the Green Function in Schwarzschild Spacetime

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We discuss a method for modelling Extreme Mass Ratio Inspirals: systems involving compact, stellar-mass bodies inspiralling into massive or supermassive black holes, which has significance for the LISA mission. The approach taken is to calculate the Green Function for an object moving around a Schwarzschild black hole. This can then be used to calculate the so-called "self-force": the deviation from a background geodesic due to the object's own field. As a result one can compute the resulting orbital evolution and resulting gravitational radiation. By rewriting the wave equation in this background spacetime, we show how this problem can be posed as an initial value problem in an effectively flat, 2D spacetime, allowing for a relatively straightforward numerical calculation of the Green Function. We will outline this algorithm, the necessary initial conditions, and present results of this approach.