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Using Radial Basis Functions to Interpolate along Single-Null Characteristics[1] MARIA BABIUC, Marshall University, CLYDE-EMMANUEL MEADOR, Bluefield State College — The Cauchy-Characteristic Extraction (CCE) technique is the most precise method available for the computation of the gravitational waves obtained from numerical simulations of binary black hole mergers. This technique utilizes the characteristic evolution to extend the simulation to null infinity, where the waveform is computed in inertial coordinates. Although we recently made CCE publicly available to the numerical relativity community, there is still room for improvement, and the most important is enhancing the overall accuracy of the code, by upgrading the numerical methods used for interpolation and differentiation. One of the most promising ways is to use the Radial Basis Functions (RBFs) method, which is grid independent, and provides spectrally accurate solutions. We used the multiquadric RBFs to do the interpolation and differentiation on the characteristic. Our tests indicate that the RBFs method gives significantly better results for a single-null characteristic than the finite-difference methods used currently in the code. This is a work in progress toward improving the accuracy of the code, which is relevant for the new generation of advanced gravitational wave detectors.

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