Control of Physical Parameters in Binary Black Hole Initial Data

Iago Mendes^{1,2}

Mentors: Nils L. Vu¹, Mark A. Scheel¹, Saul A. Teukolsky^{1,3}

Report submitted as part of Caltech's Summer Undergraduate Research Fellowship

(Dated: September 21, 2024)

Abstract

- 1. Introduction
- 2. Theory
- 2.1. The XCTS system
- 2.2. Calculation of asymptotic quantities
- 3. Numerical method
- 4. Results
- 4.1. Convergence of asymptotic quantities
- 4.2. Control iterations
- 4.3. Tests over the parameter space
- 5. Conclusion

Acknowledgements

¹Theoretical Astrophysics 350-17, California Institute of Technology, Pasadena, CA 91125, USA

²Department of Physics and Astronomy, Oberlin College, Oberlin, Ohio 44074, USA

³Cornell Center for Astrophysics and Planetary Science, Cornell University, Ithaca, New York 14853, USA