

Abstract Submitted
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Stability of Iterative Algorithms for Rotating Neutron Stars¹

CHARALAMPOS MARKAKIS, University of Wisconsin - Milwaukee, RICHARD H. PRICE, ALAN FARRELL, University of Texas - Brownsville, JOHN L. FRIEDMAN, University of Wisconsin - Milwaukee — Similar methods have been used to construct models of rapidly rotating stars, in Newtonian and relativistic contexts. The choice of method has been based on numerical experiments, which indicate that particular methods converge quickly to a solution, while others diverge. The theory underlying these differences, however, has not been understood. In an attempt to provide a better theoretical understanding, we analytically examine the behavior of different iterative schemes near an exact solution. We find the spectrum of the linearized iteration operator and show for self-consistent field methods that iterative instability corresponds to unstable modes of this operator.

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