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Numerical Solution of the Schwarzschild Interior in Loop Quantum Cosmology[1] ALEC YONIKA, GAURAV KHANNA[2], University of Massachusetts, Dartmouth — In loop quantum cosmology (LQC), the quantum-scale geometry of spacetime is defined by two-dimensional finite-difference (FD) equations. Serious numerical work on the stability and correctness of these models has, so far, been lacking in the literature. Our project is to numerically analyze a novel equation derived to resolve the singularity problem in the Schwarzschild case. We will see under what conditions the stability of this FD model is guaranteed. And we will test if, when evolved, the model gives appropriate results to both LQC and GR predictions in the correct regime. Many benchmarks in progress for this project have already been completed. We will analyze the two-dimensional model in large to small space and time iterations. But, we have already: analyzed the stability conditions for both two-dimensional and two one-dimensional statements, seen that the result converges to a semi-classical result, and have a two-dimensional program to evolve boundary conditions under our stencil.

[1]NASA Massachusetts Space Grant Consortium
[2]Advisor to Alec Yonika

Alec Yonika
University of Massachusetts, Dartmouth

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