

Abstract Submitted
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What is the singular behavior of the gravitational field near generic big-bang type events? ELLERY AMES, JAMES ISENBERG, University of Oregon, FLORIAN BEYER, University of Otago, NZ — While specific examples of solutions to the Einstein equations are well-known and provide useful physical models, significantly less is known about the behavior of general solutions to these equations. One outstanding set of questions concerns the behavior of general solutions in their singular regions. We consider certain classes of solutions to the Einstein equations in the cosmological setting, and show that within these classes there are families of solutions whose singular behavior can be well-understood using analytical techniques. These results are based on a so-called “Fuchsian method,” which we develop, for investigating the behavior of solutions to singular hyperbolic partial differential equations. Similar techniques should be adaptable for broader applicability in physics.

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