

*Department of Mathematics,
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Computational Geometric Mechanics Research Seminar

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Building Three-Dimensional Differentiable Manifolds Numerically

Abstract:

I am interested in developing numerical methods for solving PDEs (e.g. Einstein's equation) on manifolds with topology $\mathbb{R} \times M$, where M is a three-dimensional manifold with arbitrary topology. This talk will describe the basic methods we have developed for constructing convenient representations of these manifolds suitable for this numerical work, and some simple examples will be shown. There won't be time in this talk to describe everything we have done, so I will focus on just one issue: how to construct C^0 reference metrics on these manifolds. We now have methods that can construct such metrics automatically for a fairly large collection of manifolds. Unfortunately, these methods fail in general, so improved methods are needed.

November 15, 2022

9:30 AM

APM 6402
