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Semiclassical limit of Loop Quantum Gravity: from graphs to manifolds

Abstract: The building blocks of a quantum theory of General Relativity are expected to be discrete structures. Loop Quantum Gravity is formulated using a basis of spin networks (wave functions over oriented graphs with colored edges), thus realizing the aforementioned expectation. Semiclassical states should, however, reproduce the classical smooth geometry in the appropriate limits. The question of how to recover a continuous geometry from these discrete structures is, therefore, relevant in this context. Here we explore this problem using properties of Voronoi graphs.

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