

Gauge-invariance in cellular automata

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Abstract

Gauge-invariance plays a fundamental role in physics as it provides the mathematical tools for the derivation of every fundamental interaction. In this talk, I will introduce the core concepts of gauge-invariance in cellular automata which is a well-established model of computation that accounts for euclidean space. This talk will be divided into three steps, first I will introduce the definitions of gauge-invariance and cellular automata, then describe a step-by-step gauging procedure for cellular automata, and finally, give examples of implementation both in the classical and quantum cases.