Functional renormalization group and group field theories: rank 3 Abelian model

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Abstract

The continuum limit of discrete approaches to quantum gravity as group field theories is a major open challenge that can be explored by the functional renormalization group. At the same time, such theories are unconventional quantum field theories due to the non-trivial combinatorial structure of their interactions and subtleties in the application of functional methods come in. In this contribution I will discuss the complete (momentum independent) quartic order truncation of the effective average action of a real Abelian rank-3 tensorial group field theory. At this order, the truncation is complete due to the inclusion of non-melonic as well as double-trace interactions. Usually, one would expect that the inclusion of more operators that belong to the underlying theory space corresponds to an "improvement" of the truncation of the effective average action. We show that such an enlargement of the truncation brings non-trivial effects. Some perspectives on how to circumvent these issues are discussed.

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