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Towards classifying perturbative conformal field theory in 4-eps expansion

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Classifying perturbative fixed points near upper critical dimensions is crucial for understanding the space of conformal field theories and critical phases of matter. The one-loop beta functions for general scalar field theories are a set of polynomial equations. There are various mathematical approaches to solve these equations, including Buchberger's algorithm to calculate the Gröbner basis and a group theory approach that relies on known subgroups of the orthogonal group. I will introduce the history of this problem and then discuss our recent revisit of this problem.

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