

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Regularization of Diagrammatic Series with Zero Convergence

Radius BORIS SVISTUNOV, University of Massachusetts, Amherst, LODE POLLET, ETH, Zurich, NIKOLAY PROKOF'EV, University of Massachusetts, Amherst — The divergence of perturbative expansions which occurs for the vast majority of macroscopic systems and follows from Dyson's collapse argument, prevents the direct use of Feynman's diagrammatic technique for controllable studies of strongly interacting systems. We show how the problem of divergence can be solved by replacing the original model with a convergent sequence of successive approximations which have a convergent perturbative series while maintaining the diagrammatic structure. As an instructive model, we consider the zero-dimensional $|\psi|^4$ theory. We believe that this approach opens up an opportunity to utilize Feynman's diagrams as a generic tool to address strongly correlated classical- and quantum-field systems, especially in the context of Diagrammatic Monte Carlo.

Boris Svistunov
University of Massachusetts, Amherst

Date submitted: 19 Nov 2010

Electronic form version 1.4