Review of: "Dimensional Regularization as Mass Generating Mechanism"

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Article rating

1.33|**3** reviewers

I find Ervin Goldfain's “Dimensional Regularization as Mass Generating Mechanism” confusing and without clear results. It begins with a decent review of divergences in Quantum Field Theory (QFT) and the need for regularization. Then it reviews two standard methods of regularization, Pauli-Villars (the introduction of massive states which cancel the divergences of the real states) and dimensional regularization (moving to a non-integer dimension to isolate the divergence.) To this point the article is clear and standard.

Then Goldfain assumes that the divergences must be equal and quickly makes several claims about how the implications this has on particle masses. Equating divergences is highly questionable as the general program of perturbation in quantum field theory is to isolate divergences and make them cancel in physical predictions. Thus, the whole program is to make them irrelevant. It is generally important to be very careful to keep a consistent regulator throughout a problem so that the infinite parts will cancel and will not give spurious results in physical predictions. Indeed, with inconsistent regulators, two infinite quantities might not even cancel. One could argue that Goldfain's requirement is one to allow you to use one regulator in one part of a calculation and a different one in another, and perhaps there is a reason that this should be physically relevant, but this is not explained in the article.

Goldfain then makes four claims about the physical implications of this equivalence. All seem to refer to his previous work and how they relate to this connection of regulators is not explained. I briefly reviewed two of his previous papers but found no clear explanations of his results.