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Infrared Subtleties and Chiral Vertices at NLO: An Implicit Regularization Analysis

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We employ implicit regularization (IReg) in quark-antiquark decays of the Z, or of a scalar (CP-even or odd) boson at NLO, and compare with dimensional schemes to reveal subtleties involving infrared divergence cancellation and γ_5 -matrix issues. Besides the absence of evanescent fields in IReg, such as ϵ -scalars required in certain schemes that operate partially in the physical dimension, we verify that our procedure preserves gauge invariance in the presence of the γ_5 matrix without requiring symmetry preserving counterterms while the amplitude is infrared finite as required by the KLN theorem.

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