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A Simple Subtraction Scheme for Calculation of the Anomalous Magnetic Moment of the Electron in QED

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A “forest-like” subtraction scheme is proposed for removal both ultraviolet and infrared divergences in Feynman amplitudes. This scheme is developed especially for QED calculation of the anomalous magnetic moment. The procedure gives a finite Feynman-parametric integral for any Feynman diagram (at any order of perturbation), so we don’t need any regularization. The subtraction scheme is described in terms of linear operators that transform Feynman amplitudes of UV-divergent subdiagrams into polynomials of degree that is less or equal than the UV degree of divergence of the subdiagram. So we can say that this is a modification of Scherbina-Zavyalov-Stepanov-Zimmermann forest formula. This subtraction is equivalent to the on-shell renormalization, so we don’t need any “residual renormalizations” or other manipulations with finite values that are obtained by this procedure. The method can be used for numerical calculation at high orders of perturbation.

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