SELF-CONSISTENT RENORMALIZATION AS AN EFFICIENT REALIZATION OF MAIN IDEAS OF THE BOGOLIUBOV–PARASIUK R-OPERATION

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S u m m a r y

> Il libro della natura é scritto in lingua matematica.
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> *Galileo Galilei,* [*Il Saggiatore, 1623*].

> "...At the present time, the intimate connection between causality and the analytic continuation is revealed. So, it is not improbable to develop a subtraction procedure even in the most general case by the use of analytic continuation techniques."
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> *O.S. Parasiuk,* [[7], *p.566, the last paragraph, 1956*].

This possibility is realized explicitly and efficiently in a body of our self-consistent renormalization (SCR). The self-consistency means that all formal relations between UV-divergent Feynman amplitudes are automatically retained as well as between their regular values obtained in the framework of the SCR. Self-consistent renormalization is efficiently applicable on equal grounds both to renormalizable and nonrenormalizable theories. The SCR furnishes new means for the constructive treatment of new subjects: i) UV-divergence problems associated with symmetries, Ward identities, and quantum anomalies; ii) new relations between finite bare and finite physical parameters of quantum field theories. The aim of this paper is to expose main ideas and properties of the SCR and to describe three mutually complementary algorithms of the SCR that are presented in the form maximally suited for practical applications.