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Action principle for OPE. (English) Zbl 1380.81187

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Summary: We formulate an “action principle” for the operator product expansion (OPE) describing how a given OPE coefficient changes under a deformation induced by a marginal or relevant operator. Our action principle involves no ad-hoc regulator or renormalization and applies to general (Euclidean) quantum field theories. It implies a natural definition of the renormalization group flow for the OPE coefficients and of coupling constants. When applied to the case of conformal theories, the action principle gives a system of coupled dynamical equations for the conformal data. The last result has also recently been derived (without considering tensor structures) independently by *C. Behan* [(2017; [arXiv:1709.03967](#))] using a different argument. Our results were previously announced and outlined at the meetings “In memoriam Rudolf Haag” in September 2016 and the “Wolfhart Zimmermann memorial symposium” in May 2017.

MSC:

81T08 Constructive quantum field theory

81T13 Yang-Mills and other gauge theories in quantum field theory

70S05 Lagrangian formalism and Hamiltonian formalism in mechanics of particles and systems

81T17 Renormalization group methods applied to problems in quantum field theory

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