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A rigorous derivation of the functional renormalisation group equation

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The functional renormalisation group equation is derived in a mathematically rigorous fashion in a framework suitable for the Osterwalder-Schrader formulation of quantum field theory. To this end, we devise a very general regularisation scheme and give precise conditions for the involved regulators guaranteeing physical boundary conditions. Furthermore, it is shown how the classical limit is altered by the regularisation process leading to an inevitable breaking of translation invariance. We also give precise conditions for the convergence of the obtained theories upon removal of the regularisation.

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