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A Geometrical Formalism of Functional Matching

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Field space geometry has been fruitful in understanding many aspects of EFT, including basis-independent criteria for distinguishing HEFT vs. SMEFT, reorganization of scattering amplitudes in covariant form, derivation of renormalization group equations and geometric soft theorem. We incorporate field space geometry in functional matching by dividing the field space into light and heavy subspaces. A modified covariant derivative expansion method is proposed to calculate the functional traces while accommodating the covariance of the light subspace geometry. We apply this formalism to the non-linear sigma model and reproduce the effective theory more efficiently compared to other matching methods.

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