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Non-perturbative determination of improvement coefficients using coordinate space correlators in Nf=2+1 lattice QCD

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We determine quark mass dependent order a improvement terms of the form $b_J am$ for non-singlet scalar, pseudoscalar, vector and axialvector currents, using correlators in coordinate space. We use a set of CLS ensembles comprising non-perturbatively improved Wilson Fermions and the tree-level Luescher-Weisz gauge action at $\beta = 3.4, 3.46, 3.55$ and $\beta = 3.7$, corresponding to lattice spacings a in $[0.05, 0.09]$ fm. We report the values of the b_J improvement coefficients which are proportional to non-singlet quark mass combinations and also discuss the possibility of determining the \bar{b}_J coefficients which are proportional to the trace of the quark mass matrix.

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