Improved actions and lattice coarsening effects in MCRG studies in SU(2) LGT

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We study decimation procedures and effective (improved) actions in the framework of Monte Carlo Renormalization Group (MCRG). Particular attention is paid to matching the form of the effective action to the decimation procedure in order to fulfill the MCRG equilibrium self-consistency condition. Using the static quark-antiquark potential in SU(2) LGT we probe different distance scales and find that an effective action containing multiple group representations is capable of reproducing long distance physics. In particular, appropriate matching results in the practical elimination of the coarsening/fining effect of the lattice spacing under decimation. The short distance regime of the effective theory is also studied. We carry out studies of effective actions involving both multiple representations and loops beyond the single plaquette towards determining an improved action good over a wide length scale regime.