CHIRAL CORRECTIONS TO ELECTROMAGNETIC FORM FACTORS IN THE NJL MODEL

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It has been known for a long time that the pion cloud contains important contributions to the properties of baryons, and in particular the nucleon. For example, the pion must contribute to the nucleon self energy through the so-called 'rainbow' diagram, and it has also been shown in earlier work by other authors that the pion cloud modifies the nucleon electromagnetic form factors. The NJL Model is a QCD motivated chiral effective quark theory, characterised by an effective four- body contact interaction. In an earlier work by some of the authors, nucleon electromagnetic form factors were calculated in the NJL Model. In that earlier work, chiral corrections were incorporated at the parton level, a method which has been shown produce incorrect leading non-analyitc (LNA) corrections to hadron masses leading to questions about the accuracy of the predicted chiral corrections. Based on theoretical arguments, it has been shown that in the correct treatment of chiral symmetry, one must project the quark states onto onto an effective hadronic Hamiltonian and make the chiral corrections there. The results of this approach are reported on here. Chiral corrections are made to bare electromagnetic form factors taken from the NJL Model, using the formalism from the Light Front Cloudy Bag Model. Importantly, integrals in the effective nucleon theory produce infinities which must be regularised with a choice of regularisation prescription. This amounts to a model dependence. The prescription chosen here is motivated by an experimental fit to the d-u flavour asymetry in the proton.