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Analytic representation for ^{3}He form factors

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Abstract. A modified N/D method is applied for the cases of ^{3}He charge and magnetic form factors. Anomalous cut positions are computed using possible exchanges at the photon-^{3}He electromagnetic vertex, and one of them is found at $t_a = 0{\cdot}0618$ GeV^2. The D-function is used to parametrize the two-pion cut while the N-function is taken to represent the effect of an anomalous or the three-pion cut. Excellent fits to the available experimental data on charge and magnetic form factors are obtained and several useful information on the form factors computed.

Keywords. Analytic representation; modified N/D method; ^{3}He form factors.

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1. Introduction

A modified N/D method of analytic representation of electromagnetic form factors was found to be very successful in parametrizing the experimental data on pion and nucleon form factors and obtaining useful information about them (Deo and Parida 1973, 1974; Deo 1974). In this method, the nearest normal cut contribution in the t-plane was represented by the D function and an effective range type of formula, obtainable from dispersion relation, but the next nearest normal-cut contribution was assumed to be represented by the N-function approximated by optimized polynomial expansion in a suitably chosen conformally mapped variable, Z, which maps the cut in the t plane onto the boundary of a parabola in the Z plane (Cutkosky and Deo 1968; Ciulli 1969; Deo and Parida 1971). Further modifications have been suggested in order that this approach be applicable for the form factors of light nuclei (Parida 1979; Parida *et al* 1983; Agrawalla and Parida 1985). The applicability of the modified N/D method has been successfully tested for isoscalar light nuclei like deuteron and ^{4}He. In the case of the deuteron, the anomalous cut is nearer to the origin than any other cut, but computations in the case of ^{4}He revealed that all anomalous cut positions are farther away than the normal three-pion cut in t-plane (Agrawalla and Parida 1985). Parametrizing the anomalous cut contribution by the N function, and including the exponential weight function in the Laguerre polynomial expansion, have resulted in obtaining excellent fits to the data on charge and magnetic form factors of deuteron and the charge form factor of ^{4}He (Agrawalla and Parida 1985). In this paper the modified

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