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"Weighted Dispersion Relations" and Cut to Cut Extrapolations

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Abstract. Using error-affected data for the scattering amplitude on a part of the cuts, we construct a stable extrapolation procedure for it to the remaining parts of the cuts (higher energies or crossed reactions), using Carleman-weighted dispersion relations. To this end, it is assumed that the amplitude satisfies on the cut some smoothness condition of the Hölder type.

1. Introduction and Statement of the Problem

The results contained in this paper were obtained during our stay at Nordita in 1969 and have already been presented in a seminar at the 1969-Lund Conference. This delay in publishing them is due to the fact we tried to optimize our extrapolation procedures. So far we managed to do this optimization only for extrapolations to the interior points [1]; the problem seems to be more difficult for boundary points and so we decided to publish these available partial results.

One often meets need of extrapolating the available experimental data either along the same cut in order to get informations about the high or intermediate energy behaviour from the low energy region, or to the crossed cut to obtain e.g. the partial waves of the crossed reaction.

One way of performing this would, of course, be that of first bringing parts of the second sheet onto the first sheet by a suitable conformal mapping such that the points of the cut become interior points of the analyticity domain D under consideration, and then applying the produre described in [1]. Unfortunately, one is faced with the lack of knowledge about the position of the singularities on the second sheet so that the usual analyticity requirements might be disobeyed. Although one can first proceed to the location of these singularities as is done in [2] and the results of the above extrapolation might be quite good, the aim of this paper is to present an extrapolation method to the cuts based solely upon some smoothness conditions to be satisfied by the scattering amplitude on these cuts.