This article is a follow-up of the recent proposal of S-matrix formulation for $\mathcal{N} = 4$ super Yang-Mills theory [1]. The proposed S-matrix is described by a contour integral over a Grassmannian defined in the so-called dual twistor space. This article studies the operation of inverse soft factors (which is also introduced in [1]) on the scattering amplitudes of the $\mathcal{N} = 4$ theory with particular focus on the cases of NMHV and N^2MHV amplitudes. For those readers who are not familiar with the materials in [1], it is recommended to skim over it as well as [2] in advance, otherwise the readers may lose a physical point of view, distracted by lots of technicalities.

What the article claims is that the action of inverse soft factors on the scattering amplitudes can take a simple form in momentum twistor space and by use of this fact one can explicitly calculate leading residues of NMHV and N^2MHV Grassmannian integrals. Generalization of these results are also considered and it is conjectured that residues of non-MHV Grassmannian integral in general may be described in terms of a set of dual superconformal invariants which are homogeneous functions of five momentum twistors [3].

References

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