

Further studies on a recently proposed S-matrix formulation of  $\mathcal{N} = 4$  super Yang-Mills theory [1] are carried out in this article, with particular emphasis on its technical developments. The S-matrix is described by a contour integral over a Grassmannian defined in the so-called dual twistor space. One of the main purposes of this article is to show the equivalence between the BCFW [2] and the CSW [3] representations of tree amplitudes by means of a certain deformation of the integral contours over the Grassmannian. It is explicitly shown for NMHV (next-to-MHV) tree amplitudes and also, in an implicit fashion, for  $\overline{\text{MHV}}$  (“conjugate MHV” or initially called “googly”) tree amplitudes. The equivalence between the two representations has been reported by Risager in [4].

The results suggest that further understanding of the integral contour and its deformations is a key to local space-time physics embedded in the dual-twistor formulation of the Grassmannian S-matrix.

## References

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