In this article, a supersymmetric version of the Kawai-Lewellen-Tye (KLT) relation [1] is obtained by direct use of the Britto-Cachazo-Feng-Witten (BCFW) recursion relations [2]. Although it has been developed in connection with twistor string theory, the BCFW recursion relation itself can be regarded as a purely field theoretic technique. This suggests that the KLT relation, originally derived from relations between open and closed string tree amplitudes, can also be derived field theoretically. In this article, the authors obtain a generalized KLT-type relation between scattering amplitudes of $\mathcal{N} = 4$ super Yang-Mills theory and those of $\mathcal{N} = 8$ supergravity. The resultant relation satisfies recently reported identities among gauge-theory amplitudes [3] and produces identities for amplitudes involving scalars and fermions. These results are expected to be useful for further understanding of a squared relation between gauge theory and gravity and, presumably, for the construction of massive models in spinor-helicity formalism.

References

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