Recently, a new identity for color-ordered tree amplitudes of massless gluons is obtained [1]. This identity gives a set of helicity-independent relations that will be useful for economical calculations of the amplitudes. In the article under review, this new result is applied to color-ordered tree amplitudes of gluons with non-gluonic matter, where two of the scattering particles are given by a pair of adjoint fermions (or adjoint scalars) with the remaining particles being gluons, by use of supersymmetric Ward identities. For maximally helicity violating (MHV) amplitudes, it is shown that the above relations can be extended and generalized to these matter amplitudes. The generalization is also confirmed for six- and seven-point next-to-MHV matter amplitudes.

References

[1] Z. Bern, J. J. M. Carrasco and H. Johansson, Phys. Rev. D **78**, 085011 (2008) [arXiv:0805.3993 [hep-ph]].