

## A Note on Massless Field Equations for Arbitrary Spin

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In a recently published article Lord (1972) proves the equivalence of the massless field equations written down by Nelson & Good (1969) to those of Dirac. We wish to point out that the entire analytical development, as well as the aforementioned equations, can be found in earlier work by ourselves. It is unnecessary, and of course undesirable, to repeat our results, which are more complete than those of Lord, but perhaps we can be permitted simply to indicate the relevant references.

Some relations for the generalised Pauli matrices  $t^{(\mu)}$  were derived in our paper (1966a) which was concerned with extending the formalism of Barut, Muzinich and Williams and of Weinberg to curved space. In our next work (1966b) we discussed massless field equations at some length and incidentally pointed out that the quantity  $\varphi^\dagger t^{(\mu)} \varphi$  is a generalised Bel-Robinson tensor. Our next paper (Dowker, 1967) made use of the  $t^{(\mu)}$  objects in a discussion of the Zilch quantity for arbitrary spin massless fields and for gravitation in particular. For this purpose we used the way of writing the massless field equations later discovered by Nelson & Good (1969). It was then shown (Dowker, 1968a) that the Zilch tensor and the generalised Bel-Robinson tensor generate transformations equivalent to a multiple derivative of a translation. Finally, our paper of 1968b (Dowker & Goldstone) provides a more comprehensive and reasonably complete description of the algebraic properties of the  $t^{(\mu)}$  and of related quantities and contains, among other things, in Section 5, a neater discussion of the equivalence of the various ways of writing the massless field equations.

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