50-component Theory for Spin 2 Particle, Plane Wave Solutions, Massive and Massless Cases

A. V. Ivashkevich,

A. V. Bury[1],

V. M. Red'kov[1],

V. V. Kisel[1].

2023

[1]Белорусский государственный университет информатики и радиоэлектроники

Keywords: spin 2 particle, tensors of 2-nd and 3-rd ranks, anomalous magnetic moment, plane wave solutions, massless field, eliminating the gauge components.

Abstract: It is known a 50-component theory for a spin 2 particle with the anomalous magnetic moment, invariant under the Lorentz group and based on the use of symmetric 2-nd rank tensor and a 3-rd rank tensor symmetric in two indices. Their symmetries are similar to these of the metric tensor and Christoffel symbols of General relativity. By eliminating the 3-rd rank tensor we derive a system of 2-nd order 10 equations for symmetric tensor. This system is studied for plane wave solutions. In massive case, we have found 5 independent solutions. Separately, we have examined the case of a massless field. There are found 6 independent solutions, 4 special combinations of them are identified with the gauge solutions in accordance with Pauli - Fierz approach. Finally we have found two solutions which do not contain any gauge components.

Источник публикации: 50-component Theory for Spin 2 Particle, Plane Wave Solutions, Massive and Massless Cases / A. V. Ivashkevich [et al.] // Nonlinear Dynamics and Applications. – 2023. – Vol. 29. – P. 331–343.