

Spin 2 Particle with Anomalous Magnetic Moment in Presence of Uniform Magnetic Field, Exact Solutions and Energy Spectra

A. V. Ivashkevich,

A. V. Bury¹,

V. M. Red'kov¹,

V. V. Kisel¹.

2023

¹Белорусский государственный университет информатики и радиоэлектроники

Keywords: spin 2 particle, anomalous magnetic moment, external magnetic field, tetrad method, projective operators, exact solutions, energy spectral.

Abstract: The 50-component matrix equation for spin 2 particle with anomalous magnetic moment is studied in presence of external magnetic field. The matrix tetrad based form of equation in the cylindrical coordinates is used. By diagonalizing the operators of energy, of the third projection of the total angular momentum and the third projection of the linear momentum we derive the system of 50 differential equations of the first order in polar coordinate. In accordance with the method by Fedorov – Gronskiy based on the use of projective operators, we express all the 50 variables through 7 different functions? equations for them reduce to the confluent hypergeometric functions. In the result, we obtain a 50-component system algebraic equations which should determine the structure of the total wave function. After eliminating the variables related to 40 components of the third rank tensor we derive the homogeneous algebraic system of 10 equations. It is solved, giving 5 independent solutions. There arise 5 different

energy spectra as solutions of the 2-nd and the third order equations. They are found in analytical form and studied numerically.

Источник публикации: Spin 2 Particle with Anomalous Magnetic Moment in Presence of Uniform Magnetic Field, Exact Solutions and Energy Spectra / A. V. Ivashkevich [et al.] // Nonlinear Dynamics and Applications. – 2023. – Vol. 29. – P. 344–391.