BINORMAL SCHRODINGER EVOLUTION OF WAVE POLARIZATION VECTOR OF LIGHT IN THE NORMAL DIRECTION

Talat Körpınar[1], Rıdvan Demirkol[1], Zeliha Körpınar[1], and VEDAT ASİL[2]

[1]Mus Alparslan Universitesi
[2]Firat Universitesi

April 28, 2020

Abstract

In this paper, we mainly focus on the theory of evolution of wave polarization in the normal direction of the curved path, which is assumed to be the trajectory of the propagated light beam. The polarization state of the wave is described by the unit complex transverse field component by eliminating the longitudinal field component, which reduces the dimension of the problem. A Coriolis term is also effectively used to describe the relationship between the geometric phase and the parallel transport law of the wave polarization vector of the evolving light beam in the normal direction of the curved path. We further present a unified geometric interpretation of the binormal evolution of the wave polarization vector in the normal direction of the curved path via the nonlinear Schrodinger equation of repulsive type. Finally, we can sum up these discussions by investigating the analytic solutions of the nonlinear Schrodinger equation of repulsive type, which represents binormal evolution of the polarization vector in the normal direction of the curved path trajectory, for some special cases by using the traveling wave hypothesis approach.

Hosted file

`Binormal Schrodinger evolution.pdf` available at https://authorea.com/users/295597/articles/437670-binormal-schrodinger-evolution-of-wave-polarization-vector-of-light-in-the-normal-direction