1051-34-82 **Gro Hovhannisyan*** (ghovhann@kent.edu), 6000 Frank Avenue, NW, North Canton, OH 44720.
Fundamental Solution of Dirac System on Time Scales. Preliminary report.

We construct the fundamental solution of time dependent linear Dirac system on time scales in terms on phase functions. Unknown phase functions could be found by asymptotic methods, for example by perturbation methods.

We establish the error estimates for representation of solutions via asymptotic solutions as well. We show that for any choice of approximate phase functions the error functions could be estimated by the characteristic functional on phase functions. From these estimates it is concluded that one could minimize the error functions by choosing appropriate phase functions that are minimizing the characteristic functional.

Using this representation we introduce the adiabatic invariants for the Dirac system on time scales, which are close to the adiabatic invariant of Lorentz's pendulum. Using a small parameter method we show that the change of the adiabatic invariants approaches zero with power speed as small parameter approaches zero.

As another application of the fundamental solution we calculate the transition probabilities for the discrete Dirac system. We show that for the special choice of electromagnetic field the only transition of an electron to the positron with the opposite spin orientation is possible. (Received August 15, 2009)