Review of: "Representations and Implications of Papers Written by E.T. Whittaker in 1903 and 1904"

Manfried Faber[1]

1 Technische Universität Wien

Potential competing interests: No potential competing interests to declare.

As the title announces the author discusses two interesting historical articles by E.T. Whittaker which have been neglected by the community. One of the purposes of the paper is to animate readers to read the original articles of Whittaker. In my case this aim was successfully reached.

In the Introduction Titleman hopes that some of the problems of the present understanding of gravitation and electromagnetism may get simplified by studies of Whitaker's articles.

In the present form the formulae of the chapter "Representations of the Works of E.T. Whittaker" are not really understandable without reading the original articles, since the variables used there are not those used in the present literature. One can guess only from the integration region that u and v are azimuthal and polar angle of spherical coordinates. Some comments about the variables and the appearance of the imaginary unit would be helpful.

Concerning Whittaker's 1904 paper it would be instructive to mention under which assumptions the formulae were derived, e.g.under the assumption that the trajectories of the electrons as sources are known and the resulting fields follow a linear superposition principle as indicated by Maxwell's equations. Again it would help to mention the meaning of the variables, of bars and primes of the coordinates.

Eqs.(1), (2) and (5) miss some spaces. Usually, basic functions are written in roman letters.

I cannot say much about the gravitational implications of Whitaker's work. But I was very much inspired by the discussion about the description of electrodynamics with two functions F and G only and the comment that singularities could be potentially eliminated. This, because I have suggested in several papers, first in hep-th/9910221 (also overlooked by the community), more recently in Universe 8(2):73(2022), a model for electrodynamics, especially for electrons and their fields, without any singularities, which needs 3 degrees of freedom only. This model has only one free parameter, the soliton radius which can be adjusted to the electron mass. Electrons appear there as topological solitons of finite size and mass, quantised charge and spin 1/2. Reducing these solitons to zero size leads to the well-known singularities of point-like (dual) Dirac monopoles in the non-Abelian Wu-Yang representation. This formulation of point-like electrons and their field can be derived from a normalised three-component vector field \vec n in Minkowski space and does not need Dirac strings. This \vec n-field has only two parameters, the polar and the azimuthal angle. These angles seem in close relation to the two functions F and G of Whittaker. If this suspicion is true, Whittaker could have anticipated Dirac's model of magnetic monopoles and dual symmetric electrodynamics of electrons, monopoles and their fields.

I conclude that Whittaker was only able to formulate the electrodynamic field by two functions F and G, since he took into account the trajectories of electrons only and not the dynamics of electrons, guided by the back reaction of the electromagnetic field. Here I contradict the potentiality, mentioned by Titleman, that singularities of charges can be eliminated by Whitaker's theory.

Titleman's article is very inspiring. Hopefully it will also inspire future work on gravitation and help us to arrive finally at a deeper understanding about the mechanisms working in nature.