THE m THEORY IN HAMILTON DYNAMICS

by

M. W. Evans and H. Eckardt,

Civil List and AIAS / UPITEC

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ABSTRACT

Using the Hamilton Principle of Least Action and the Hamilton canonical equations, it is shown that m theory is rigorously self consistent. A new equation of motion is derived for m theory from the Hamiltonian dynamics combined with the Euler Lagrange dynamics.

Keywords: ECE2 Theory, m Theory, Hamilton Dynamics.

4FT 425

1. INTRODUCTION

In recent papers of this series {1 - 41} it has been shown that a new source of energy is available in the most general spherically symmetric sapcetime, ("m space") characterized by a function m (r) in the relevant infinitesimal line element. In Section 2 of this paper it is shown that the combined use in m theory of the well known Euler Lagrange and Hamilton dynamics produces a new equation of motion. The canonically conjugate variables of m theory in Hamilton dynamics are defined, and the hamiltonian expressed in terms of these variables. Computation and solution of the new equation of motion provides a great deal of new information about m theory.

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This paper is a brief synopsis of detailed notes accompanying UFT425 on www.aias.us. Note 425(1) considers the Hamilton equation in special relativity and defines its well known canonically conjugate generalized coordinates p and q. Note 425(2) reviews the fundamental theory of the Hamilton canonical equations on the Newtonian level and in special relativity and m theory. The conjugate coordinates p and q are defined in each case and the Hamilton equations derived from Hamilton's Principle of Least Action and it shown in detail that Hamilton's dynamics are valid in special relativity and m theory. The new equation of motion of this paper is derived. These results are consolidated and developed in Note 425(3), and the vector Hamilton equations introduced. It is shown that the fundamental theory produces a new equation of motion of m theory in a precisely self consistent way and various solutions of the new equation of motion are discussed. In Note 425(4) the Lagrange equations are used to define the hamiltonian in a well known method and the Hamilton equations derived from the Euler Lagrange equations. The Hamilton equations are exemplified on the Newtonian level for ease of reference. In Note 425(5) the Hamilton equations are used in special relativity and p and q defined in special relativity. These notes are background calculations for the derivation of the new equation of motion of m theory.

2. DERIVATION OF THE NEW EQUATION OF MOTION OF m THEORY.

As shown in Note 425(2) the fundamental equations of m theory in frame ($\mathbf{r}, \boldsymbol{\phi}$)

are as follows. The frame is defined by:

$$\Gamma_{1} = \frac{\Gamma}{m(r)^{1/2}} - (1)^{1/2}$$

and as shown in UFT417 ff is needed for self consistency. The lagrangian of m theory is: $\langle \rangle$

$$J = -mc^{2}\left(m(r_{1}) - \frac{1}{2}\left(r_{1} + r_{1}^{2} + r_{1}^{2}\right)\right)^{1/2} + \frac{mmr}{r_{1}} - (a)$$

where the potential energy is:

$$\overline{U} = -nM\overline{b} - (3)$$

and describes a mass m orbiting a mass M in a plane. Here G is the Newton constant. The

generalized Lorentz factor of m theory is:

$$\begin{aligned}
\chi &= \left(n\left(r_{1}\right) - \frac{v_{1}}{c^{2}}\right)^{-1/2} - (4)
\end{aligned}$$
where:

$$\begin{aligned}
\chi_{1}^{2} &= r_{1}^{2} + r_{1}^{2} \frac{1}{c^{2}} - (5)
\end{aligned}$$

in frame ((). As shown in UFT424 the hamiltonian of m theory is derived from the

$$H = \frac{Pic}{Ymc} - \mathcal{I} - (6)$$

The total relativistic energy of m theory is:

$$E = w(t) \lambda w - (1)$$

and the Einstein energy equation in m space is:

$$E^{2} = m(r_{1})(p_{1}^{2}c_{1}^{2} + m_{2}c_{1}^{4}) - (8)$$

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The Euler Lagrange equations in m space are:

$$\frac{d}{dt} \frac{d}{dt} = \frac{d}{dt} + \frac{d}{dt} + \frac{d}{dt} = \frac{d}{dt} + \frac{d}{dt}$$

and the Hamilton canonical equations in m space are:

$$\dot{P}_{1} = -\frac{\partial H}{\partial r_{1}} - (10)$$

$$\dot{P}_{1} = -\frac{\partial H}{\partial P_{1}} - (11)$$

$$\dot{P}_{1} = -\frac{\partial H}{\partial P_{1}} - (11)$$

with canonically conjugate generalized coordinates:

°√1 =

$$P_{1} = \chi_{m}\chi_{1}, \quad \chi_{1} = \zeta_{1} - (12)$$

and:

$$P_{\phi} = L$$
, $\mathcal{N}_{\phi} = \phi - (B)$

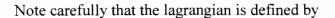
where L is the angular momentum of m theory:

$$L = Xmri \not= (14)$$

= 0

-(15)

This is a constant of motion, so:



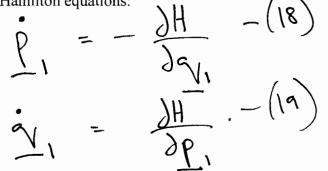
λt

$$\mathcal{L} = \mathcal{I}(\mathcal{N}, \mathcal{N}, \mathcal{H}) - (\mathcal{H})$$

and the hamiltonian is defined by:

$$H = H(\mathcal{N}, \mathcal{P}, \mathcal{F}) - (\Pi)$$

in which p and \Im are generalized coordinates that are canonically conjugate and independent as is well known. On the other hand \Im and \Im are not independent. It is also possible to define the vector Hamilton equations:



and

The canonically conjugate generalized coordinates of m theory are:

$$P_{1} = V_{m}V_{1}, \quad V_{1} = r_{1} - (20)$$

and in general the hamiltonian and lagrangian of m theory are related by:

PI

$$J = P_1 \gamma_1 - H - (21)$$

As shown in UFT424:

$$P_1 q_1 = m(r_1) \forall mc - mc - (22)$$

In the lagrangian formulation of m theory:

$$= \frac{JI}{\partial r_1} - (23)$$

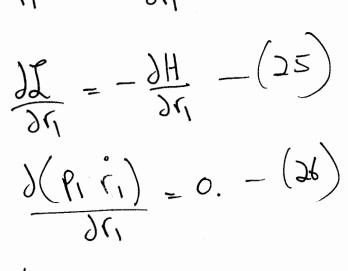
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and in the hamiltonain formulation of m theory:

$$P_1 = -\frac{JH}{2r_1} - (JH)$$

 $\langle \neg \rangle$

It follows that:



and

Eqs. (
$$25$$
) and (26) both give the new equation of motion:

$$\frac{\partial}{\partial r_1} \left(\sqrt[3]{n_1}(r_1) \right) = \frac{\partial}{\partial r_1} \left(\frac{1}{\sqrt[3]{n_1}} \right) - \left(\frac{1}{\sqrt[3]{n_1}} \right)$$

in a precisely self consistent way Q. E. D.

From Eqs. (27) and (4), computer algebra shows that:

$$\frac{dn(r_i)}{dr_i} = -\frac{2r_i\phi}{c}\left(\frac{1+r_in(r_i)}{1-r_in(r_i)}\right) - (28)$$

which is a differential equation for dm(n)/dn in terms of m (r1). Therefore the use of the Hamilton equations means that m (n) is no longer empirical. The angular momentum of m theory is:

$$\Gamma = \lambda w (j \phi - (3a))$$

so Eq. (28) can be written as:

$$\frac{dm(l_1)}{dl_1} = -\frac{dL}{\gamma^2 c^2 m^2 l_1^3} \left(\frac{1-\gamma^2 m(l_1)}{1+\gamma^2 m(l_1)} - (30) \right)$$

where L is a constant of motion. In general Eq. (30) needs specialized methods of solution, but certain limiting cases can be discussed qualitatively. For example when r is very large and \oint is very small, as in the orbit of the S2 star discussed in UFT417 ff:

$$\frac{\mathrm{dm}(r_1)}{\mathrm{d}r_1} \rightarrow 0. - (30)$$

This is the condition used in a preceding UFT paper to describe the orbit of the S2 star, producing the startlingly original result that the orbit is essentially an ellipse, but one which is not described by the Kepler or Newton laws. The S2 star refutes Einsteinian general relativity by the order of a hundred times, but is well described by m theory.

3. NUMERICAL AND GRAPHICAL ANALYSIS OF EQUATION OF MOTION.

Section by Dr. Horst Eckardt.

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