Filtering Condition for Some of Viable Field Theories

A.B.Morcos
Department of Astronomy , National Research Institute Of Astronomy and Geophysics, Helwan, Cairo, Egypt.
Kottamia Center of Scientific Excellence for Astronomy and Space Sciences
e.mail: fadymorcos@hotmail.com

Abstract

Nowadays there are many of rival gravitational theories, Will (1980 and1981) put a set of six fundamental criteria for the viability of any. Among the viable theories there are many that agree with general relativity in the weak field. Also may be these viable theories agree in the strong field area. Morcos (1992) suggested three filters to differentiate between rival viable theories. These filters are formation of large scale structures in cosmological models; a theory needs minimum number of condition from outside the theory and compatibility and strength of field equation. In this work the third filter which was suggested by Einstein (1955), has been modified and simplifies the treatment, to get an expression for the strength which can be evaluated numerically for each theory. The simplified form depends the number of field variables, number of coordinate transformations, the number of identities among field equations and the number of field equations. The coefficients of freedom have been calculated for eight, 4 dimensional space-time, field theories and a comparison between their strengths is done

References

1- Brans, C. and Dicke, R,H. (1961) , Phys, Rev., **124**, 925.
2- Einstein, A. (1955) The meaning of Relativity 5th ed. Princeton University Press.
3- Hayward, J. (1981) Gen. Rel. Grav., **13**, 43.
4- Mikhail, F.I. and Wanas, M.I. (1981) Inter. J. Th. Phys. **20**, 671.
5- Mikhail, F.I. and Wanas, M.I. (1977) Proc.Roy. Soc. Lond. A, **356**,471
6- Misner, C. W., Thorne,K. S. and Wheeler, J. A. (1973) Gravitation W.H. Freeman and Company.
7- Mller, C. (1978) Mat. Fys. Medd . Dan Vid. Selsk. **39**, 13.
8- Morcos, A.B. (1992) Ph. D. Thesis , Cairo University, Egypt.
9- Ni, W.T.(1972) Ap. J., **176**, 769.
10- Nutku, Y(1969) Ap. J., **155** ,999.
11- Sue, M. and Mielke, E. W. (1990) private communication
12- Teyssandier, P. (1984) in Lecture Notes in Physics ,**176** p.212, ed: Springer.
13- Wanas, M. I. (1981) Astrophy. Space Sci., **154**, 165.
14- Wanas, M. I. (1981) IL Nuovo Cimento B **66**, 2 , 145.