

A Theorem on Spherically Symmetric Solutions in Unified Theory

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1. Introduction. Methods of generating some exact solutions of the general theory of relativity from simpler solutions are well known *e.g.* Dutta Majumdar [11], Bonner [7], Ehlers, referred in [7]. Hlavatý (p. 144 of [16]), basing his methods on consideration of affinities, has shown how certain solutions can be generated from certain others in the last unified theory proposed by Einstein [12]. In this paper a similar result in Schrödinger's unified theory [21] has been obtained. The result holds for Einstein's theory [12] also. The method is based on Schrödinger's 'para-form' equations, which, along with other necessary preliminaries, have been set down in section 2. The basic differential equations used to prove the main result are those calculated by Bonner [6]. The main result, just stated, appear in section 3. In section 4 it is shown how this result could be utilized to obtain more easily some of the solutions, worked out previously by other authors. In particular, one of the solutions in Schrödinger's theory could be obtained from the well known Schwarzschild's solution (with cosmological term, λ , present in the field equations). In section 5 the utility of the present work has been discussed and some additional brief remarks added.

2. Basic equations and symbols. The 'para-form' equations proposed by Schrödinger to determine the non-symmetric field variables, $g_{\mu\nu}$ ($\mu, \nu = 1, 2, 3, 4$), may be written as

$$(2.1) \quad R_{(ik)} = \lambda g_{(ik)} ,$$

$$(2.2) \quad \partial_{[i} R_{jk]} = \lambda \partial_{[i} g_{jk]} ,$$

$$(2.3) \quad \Gamma^s_{[is]} = 0 ,$$

where

$$R_{ik} = -\partial_s \Gamma^s_{ik} + \partial_k \Gamma^s_{is} + \Gamma^s_{it} \Gamma^t_{sk} - \Gamma^s_{ts} \Gamma^t_{ik} ,$$

Γ 's being determined by

$$(2.4) \quad \partial_a g_{ik} = g_{is} \Gamma^s_{ak} + g_{sk} \Gamma^s_{ia} .$$