

*Basic Principles of the Unified Field Theory of the Second Kind**

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GENERAL OUTLINE

The connection Γ_{λ}^{μ} of the Einstein unified field theory in a four-dimensional space-time X_4 is defined as follows†

$$(A) \quad \partial_{\omega} g_{\lambda\mu} - \Gamma_{\lambda}^{\alpha}{}_{\omega} g_{\alpha\mu} - \Gamma_{\omega}^{\alpha}{}_{\mu} g_{\lambda\alpha} = 0, \quad \left(\partial_{\omega} \stackrel{\text{def}}{=} \frac{\partial}{\partial x^{\omega}} \right).$$

Here $g_{\lambda\mu}$ is a general real tensor. This connection and the unified field theory have been dealt with in a series of papers,‡ as well as in the book mentioned in the previous footnote. The solution of (A) exists and is unique if

$$(Ba) \quad g(g - 2\mathfrak{h}) \neq 0 \quad \text{for} \quad \mathfrak{h} < 0.$$

Here g (\mathfrak{h}) is the determinant of $g_{\lambda\mu}$ (of $h_{\lambda\mu} \stackrel{\text{def}}{=} g_{(\lambda\mu)}$). We also investigated the case

$$(Bb) \quad g(g - 2\mathfrak{h}) = 0$$

and found necessary and sufficient conditions for the existence of at least one solution of (A). For all cases in which conditions (Bb) were satisfied we displayed all sets of solutions in explicit form.

In this paper we shall deal with another degenerate case, namely

$$(C) \quad \mathfrak{h} = 0, \quad g \neq 0.$$

In this case the procedure for solving (A) needs quite different tools and requires another approach.

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†EINSTEIN, A., *The meaning of Relativity*, Princeton Univ. Press, 1950.

‡For the bibliography see HLAVATÝ, V. *Geometry of Einstein's unified theory* (Noordhoff, Gröningen; in print).