On Some Reducible Quadratic Differential Forms in n-Dimensional Space.

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Introduction.

We put the question[1]: In an n-dimentional space, giving its fundamental differential form:

$$ds^2 = g_{\mu\nu} dx_\mu dx_\nu \tag{1}$$

on what condition can (1) be transformed into the form:

$$ds^2 = \sum_{i,k=1}^{n-1} \rho \bar{g}_{ik} dX_i dX_k + \theta dX^2 \tag{2}$$

where $\bar{g}_{ik}$ does not contain X, and ρ and θ are functions of X_1, X_2, ... X_{n-1}, X?

Notations and Formulae.

In this paper, we adopt the notation and formulae as follows:

$$ds^2 = g_{\mu\nu} dx_\mu dx_\nu$$

denotes the fundamental quadratic differential form of the n-dimensional space;

$$\Gamma_\nu A_\mu = \frac{\partial A_\mu}{\partial x_\nu} - \left\{\mu\nu, \alpha\right\} A_\alpha \tag{3}$$

(1) Eisenhalt obtained the condition in a geometrical form. The condition is that the space admits of a family of hypersurfaces with indeterminate lines of curvature. L.P. Eisenhalt. *Riemannian Geom.* (1926) p. 182.