

## CONFORMAL FORM OF PSEUDO-RIEMANNIAN METRICS BY NORMAL COORDINATE TRANSFORMATIONS II

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**Abstract.** In this paper, we have reintroduced a new approach to conformal geometry developed and presented in two previous papers, in which we show that all  $n$ -dimensional pseudo-Riemannian metrics are conformal to a flat  $n$ -dimensional manifold as well as an  $n$ -dimensional manifold of constant curvature when Riemannian normal coordinates are well-behaved in the origin and in their neighborhood. This was based on an approach developed by French mathematician Elie Cartan. As a consequence of geometry, we have reintroduced the classical and quantum angular momenta of a particle and present new interpretations. We also show that all  $n$ -dimensional pseudo-Riemannian metrics can be embedded in a hyper-cone of a flat  $(n + 2)$ -dimensional manifold.

### 1. Introduction

In this paper, we reintroduce a new approach to conformal geometry developed and presented in two previous papers, [10, 11]. This was based on an approach developed by French mathematician Elie Cartan [2, 8, 12]. Some classical and quantum results are reintroduced from a new viewpoint.

This paper is organized as follows. In Section 2, we present normal coordinates and elements of differential geometry. In Section 3, we show that, in normal coordinates, all  $n$ -dimensional pseudo-Riemannian metrics that are well-behaved in origin and in their neighborhood are conformal to a flat  $n$ -dimensional manifold and an  $n$ -dimensional manifold of constant curvature. In Section 4, this result is used in the Cartan solution for a space of constant curvature. In Section 5, we present more differential geometry, introducing normal tensors to build the Cartan