

Ludmila Naumova

**RIEMANNIAN SPACE.
RECOGNITION OF FORMULAS
(STRUCTURES)
OF RIEMANNIAN MANIFOLDS
BY A NEURAL NETWORK**

Ludmila Naumova

**Riemannian space. Recognition
of formulas (structures) of riemannian
manifolds by a neural network**

«Издательские решения»

Naumova L.

Riemannian space. Recognition of formulas (structures) of riemannian manifolds by a neural network / L. Naumova — «Издательские решения»,

ISBN 978-5-44-980844-8

In 1854, in Gottingen, Riemann gave the famous lecture «On hypotheses underlying geometry», where he gave an extended concept of space. Penetrating into the depth of Riemann's thought and developing it, the author logically states the following: Riemannian manifolds in the broad sense, in the concept that Riemann himself attached, are innumerable and exist in the real world. It remains to comprehend and accept the fact of their existence in the real world.

ISBN 978-5-44-980844-8

© Naumova L.

© Издательские решения

Содержание

INTRODUCTION	6
RIEMANNIAN GEOMETRY. A BROAD CONCEPT OF SPACE	7
METRIC OF RIEMANN SPACES. FOLLOW IN THE FOOTSTEPS OF RIEMANN AND EINSTEIN	8
Конец ознакомительного фрагмента.	9

Riemannian space. Recognition of formulas (structures) of riemannian manifolds by a neural network

Ludmila Naumova

© Ludmila Naumova, 2020

ISBN 978-5-4498-0844-8

Created with Ridero smart publishing system

**RIEMANNIAN SPACE. RECOGNITION OF FORMULAS (STRUCTURES)
OF RIEMANNIAN MANIFOLDS BY A NEURAL NETWORK**

INTRODUCTION

In 1854, in Gottingen, Riemann gave the famous lecture “On hypotheses underlying geometry”, where he gave an extended concept of space. This lecture was a messenger in shaping Einstein’s future theory of relativity in physics. Penetrating into the depth of Riemann’s thought and developing it, the author logically states the following: Riemannian manifolds in the broad sense, in the concept that Riemann himself attached, are innumerable and exist in the real world. It remains to comprehend and accept the fact of their existence in the real world. As a proof of the existence of Riemann spaces in reality, the author shows how, before our eyes in the XXI century, artificial neural networks already reveal the structure of Riemannian manifolds (manifolds in an extended concept, as Riemann imagined). Our geometric metric space is a special case of Riemannian manifolds. Mathematicians are still discovering new spaces in mathematical symbols that have nothing to do with reality. But real spaces and their structure (formula) are revealed in the symbolism of programming languages using neural networks.

RIEMANNIAN GEOMETRY. A BROAD CONCEPT OF SPACE

In general, geometry presupposes both the concept of space and the first basic concepts that are necessary for performing spatial constructions. It gives nominal definitions of concepts, while the essential properties of defined objects are included in the form of axioms. But the relationship between concepts and axioms can be different. Riemann drew attention to the General concept of repeatedly extended quantities, which include spatial quantities. Based on the General concept of magnitude, Riemann constructed the concept of a repeatedly extended quantity. Different world definitions are possible for a repeatedly extended quantity, and space is nothing more than a SPECIAL CASE of a thrice extended quantity. Riemann proposed to construct space (according to the laws of mathematics and logic) on the basis of the General concept of magnitude (the concept of magnitude is much broader than the concept of spatial quantities). There is a quantity of mass, magnitude of force, of velocity, of temperature value, the value of time, etc. What is a multiply extended magnitude? Classes of repeatedly extended quantities (spaces) of various types, where the unit of measurement belongs to this type of quantities, are not necessarily a unit of length, as in ordinary space. Therefore, in such “constructed spaces”, different measure definitions are possible, that is, different laws of construction and measurement of figures, i.e. different geometries are possible. This is exactly the Riemann space in the broad sense of the word. The properties that distinguish such a Riemann space from other conceivable extended quantities can only be derived from experience. We have to get out of the world, the framework of flat space. Mathematicians are discovering new spaces in mathematical symbols so far. But the real geometry of the physical world is not deduced from the General properties of extended quantities; on the contrary, the properties that space distinguishes from other conceivable forms can only be derived from experience. Pure mathematics will never be able to make a choice and say what is the true structure of real space. Only calculations based on actual observations can produce results. We will tell you how a trained neural network is a calculation that calculates Riemannian manifolds in the broad sense of the word. a neural network uses big data to determine the structure of an object (diversity).

METRIC OF RIEMANN SPACES. FOLLOW IN THE FOOTSTEPS OF RIEMANN AND EINSTEIN

Einstein used the concept of extended quantities in his theory of relativity. His feature in the theory of relativity is Minkowski's four-dimensional world "space-time continuum", just the spread of Riemann's ideas of the extended concept of manifolds. This is a Riemann variety, where a three-fold extended space is combined with a fourth quantity, time. This is an example of a fourfold extended manifold with different values (space and time), and therefore different metrics. Einstein used a variety with values of different metrics. Why not spread it, generalize it, and go further? Why not construct a manifold with an arbitrary multiple extension (i.e., dimension), where the metric for each extension (dimension) can be different? After all, this is also a repeatedly extended space (diversity) in the broad sense of the word – it is a connected set on certain characteristics and characteristics are dimensions that have their own metric. Then the question "where in life, in the real world, are these diversity (spaces)?" no longer have. They are everywhere. Next, we'll show you.

Конец ознакомительного фрагмента.

Текст предоставлен ООО «ЛитРес».

Прочитайте эту книгу целиком, [купив полную легальную версию](#) на ЛитРес.

Безопасно оплатить книгу можно банковской картой Visa, MasterCard, Maestro, со счета мобильного телефона, с платежного терминала, в салоне МТС или Связной, через PayPal, WebMoney, Яндекс.Деньги, QIWI Кошелек, бонусными картами или другим удобным Вам способом.