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General Relativity Without Calculus 13 interpret them):  $(t' = t - vx/c^2, x' = (x - vt) \sqrt{1 - v^2/c^2})$  where  $c$  represents the speed of light (about 300,000 kilometers per second) and  $\gamma = 1/\sqrt{1 - v^2/c^2}$ . The special theory of relativity, developed by Einstein in 1905, boils down to analyzing the consequences of these transformations.

## ~~General Relativity Without Calculus~~

A researcher in optical networking technologies, Gannett has shown that the Lorentz transformations and velocity addition law can be derived without assuming the constancy of the speed of light,...

## ~~Relativity Derived Without Calculus — Possibly Centuries Ago~~

General Relativity, at its core, is a mathematical model that describes the relationship between events in space-time; the basic finding of the theory is that the relationship between events in the same as the relationship between points on a manifold with curvature, and the geometry of that manifold is determined by sources of energy-momentum and their distribution in space-time.

## ~~The Maths of General Relativity — Markus Hanke~~

First general relativity is typically taught at a 4th year undergraduate level or sometimes even a graduate level, obviously this presumes a good undergraduate training in mathematics and physics. Personally, I'm more of the opinion that one should go and learn other physics before tackling general relativity.

~~What are the prerequisites to studying general relativity?~~

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ometry and general relativity require mathematical entities of still higher rank. The tools of vector analysis are simply incapable of allowing one to write down the governing laws in an invariant form, and one has to adopt a different mathematics from the vector analysis taught in the freshman and sophomore years. Tensor calculus is that ...

## ~~Tensor Calculus—SMU~~

Definition and basic properties. General relativity is a metric theory of gravitation. At its core are Einstein's equations, which describe the relation between the geometry of a four-dimensional pseudo-Riemannian manifold representing spacetime, and the energy – momentum contained in that spacetime.

## ~~General relativity—Wikipedia~~

“ General Relativity Without Calculus ” offers a compact but mathematically correct introduction to the general theory of relativity, assuming only a basic knowledge of high school mathematics and physics.

## ~~General Relativity Without Calculus—springer~~

1.14 Preview of general relativity 20 1.15 Caveats on the equivalence principle 22 1.16 Gravitational frequency shift and light bending 24 Exercises 1 27 I Special Relativity 31 2 Foundations of special relativity; The Lorentz transformation 33 2.1 On the nature of physical theories 33 2.2 Basic features of special relativity 34

## ~~Relativity—202.38.64.11~~

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~~General relativity without calculus : a concise ...~~

In general relativity, Regge calculus is a formalism for producing simplicial approximations of spacetimes that are solutions to the Einstein field equation. The calculus was introduced by the Italian theoretician Tullio Regge in 1961. Overview. The starting point for Regge's work ...

~~Regge calculus - Wikipedia~~

Manifolds Generally speaking, a manifold is a space that with curvature and complicated topology that locally looks like  $\mathbb{R}^n$ . Examples:  $\mathbb{R}^n$  itself.  $\mathbb{R}$  is a line and  $\mathbb{R}^2$  a plane. The  $n$ -sphere,  $S_n$ ; that is, the locus of all points some fixed distance from the origin in  $\mathbb{R}^{n+1}$ .  $S^1$  is a circle and  $S^2$  sphere. The  $n$ -torus  $T_n$ .  $T^2$  is the surface of a doughnut. A Riemann surface of genus  $g$ .

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