

# Thesis title

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*To Sarah, my friends, and family.*

### **Abstract**

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aequale doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguique possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et.

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# Introduction

# Section 1

## General relativity

The framework of general relativity will be used throughout this thesis as a basis to expand onto.

### 3.1. Mathematical background

The main building blocks behind that compose the mathematical basis of general relativity are the language of tensors and the riemannian geometry, the latter being the study of differential manifolds equipped with a riemannian metric.

#### 3.1.1. Tensors in general relativity

In general, a tensor is a multi-linear map between vector spaces or, alternatively, as a function that transforms under a change of coordinates in the following way

$$(T')^{a_1 a_2 \dots a_n}_{b_1 b_2 \dots b_n} = \left( \frac{\partial x'^{a_1}}{\partial x^{c_1}} \frac{\partial x'^{a_2}}{\partial x^{c_2}} \dots \frac{\partial x'^{a_n}}{\partial x^{c_n}} \right) \left( \frac{\partial x^{d_1}}{\partial x'^{b_1}} \frac{\partial x^{d_2}}{\partial x'^{b_2}} \dots \frac{\partial x^{d_n}}{\partial x'^{b_n}} \right) T^{b_1 b_2 \dots b_n}_{d_1 d_2 \dots d_n}$$

## Section 2

## Section 3



# Bibliography