



Visualizing the Metric Tensor

$$ds^2 = A(r)c^2dr^2 - r^2 (d\theta^2 + \sin^2\theta d\phi^2 + \sin^2\theta \sin^2\phi d\chi^2)$$

The metric tensor, is a fundamental mathematical object in general relativity that describes the geometric properties of spacetime. It essentially tells us how to measure distances and time intervals in a curved spacetime.

Directly visualizing the entire metric tensor as a 4D object is not straightforward. Geodesics are the paths of shortest distance between two points in a curved spacetime. Visualizing geodesics can help understand how objects move in a particular spacetime.

$A(r)$ - This function describes how the radial component of the metric varies with r . It can be plotted as a 2D graph with r on the x-axis and $A(r)$ on the y-axis.

- * $A(r) = 1 / (c^2 kr^2 - 1)$
- * $A(r)$ is a function of the radial coordinate r .
- * c is the speed of light.
- * r, θ, ϕ , and χ are the spherical coordinates.

<https://github.com/BohemianHacks/darkMatter/>