NON-LINEAR DYNAMIC MODEL FOR MASSIVE BLACK HOLES WITH KERR'S METRIC DEGENERATED

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1.- Introduction

Today, despite the detection of gravitational waves from the collision of two black holes or the halo of light trapped in a characteristic region of the black hole (M-87), we do not have direct and concise evidence in our radio telescopes, in the electromagnetic spectrum.

However, previous hypothetical features and partial detections, we find proposals for theoretical models such as the Kerr metric for dynamic and massive holes, based on the main notions of Schwarzschild, which together with the principles of the theory of General Relativity, we are clear about the gravitational and singularity collapse under an event shadow.

2.- Objective

- Propose an adjustment model for massive black holes with the Kerr metric degenerates.

- Graph and visualize, with the characteristics of mass and angular momentum, the event horizon and the singularity.

3.- Methodology

The space-time of Special Relativity is formulated mathematically as "the space
of Minkowski "the Minkowsky metric can be expressed as:

$$g = -dt^2 + dx^2 + dy^2 + dz^2$$

The set of affine transformations of Minkowsky spacetime that preserve its metric (in particular, that retain its light cones) form the group from Poincaré: the well-known physical consequences of Special Relativity, such as time dilation, length contraction or redshift, correspond to some of the mathematical properties of the action of this group. Thus, General Relativity emerges as a geometric theory of gravitation in which space-time is a four-dimensional manifold. . R. Kerr obtained an exact solution, which describes the exterior geometry of a stationary and rotating black hole. This is the Kerr biparametric family.

$$g_{\text{kerr}} = -\frac{\Delta}{U}\left(dt - a\,sen^2\theta\, d\varphi\right)^2 + U\left(\frac{dr^2}{\Delta} + d\theta^2\right) + \frac{sen^2\theta}{U}\left(adt - (r^2 + a^2)d\varphi\right)^2$$

$$U = r^2 + a^2\cos^2\theta$$

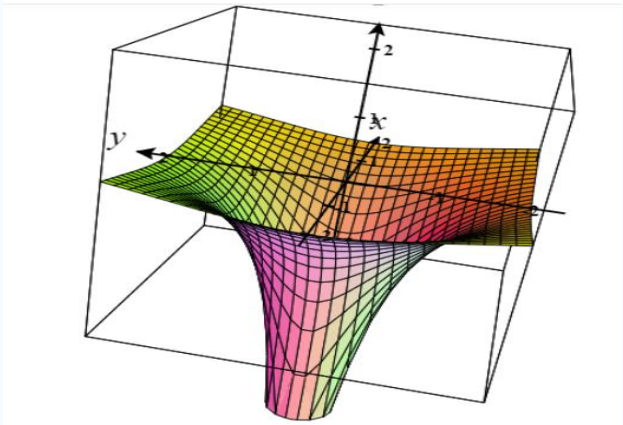
$$\Delta = r^2 - 2Mr + a^2$$

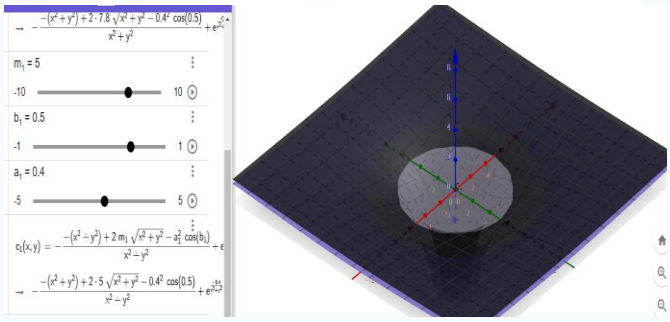
4.- Results

Kerr metric distorted by a (degenerate) disturbance in Cartesian coordinates

$$c(x,y) = -\frac{-\left(x^2+y^2\right) + 2\,m\,\sqrt{x^2+y^2} - a^2\cos(b)}{x^2+y^2} + e^{\frac{-a}{x^2+y^2}}$$

Where:
a :parameter of angular momentum per unit mass
m : mass parameter for black hole
b : azimuthal symmetry parameter
e: perturbación (degeneración de la métrica de Kerr)





5. Conclusions

- The perturbation on the Kerr metric, of the proposed model, will simulate the behavior of the Black hole.
- The proposed theoretical model based on the Kerr model with event horizons and singularity, are based on the principles of General Relativity.

Agradecimientos
A la comisión organizadora del evento **XIX Meeting of Physics,** dándome la oportunidad de expresar el estudio de investigación, a escuela de postgrado de UNT y asesor de tesis: Dr. A. Rivasplata.

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