KerrNullGeoDistant

KerrNullGeoDistant[a, $\mathcal{O}$, α, β, $radiusLimit\_ : 0$]

returns a KerrNullGeoDistantFunction which stores information about the trajectory of a light-ray scattering off the black hole from infinity. The spin a, and Bardeen's impact parameters α, β are assumed to be given in units of the BH mass

KerrNullGeoDistant[$a\_$, $\mathcal{O}\_$, $\alpha\_$, $\beta\_$, OptionsPattern[]] takes the parameter a, which is the dimensionless angular momentum (a = J / M^2 in G = c = 1 units), the polar coordinate of the observer $\mathcal{O}$, the Bardeen coordinates α, β, the optional greatest radius (in G=c=M=1 units) at which the disk near the black hole is visible *radiusLimit*, and an options pattern.

The following options can be given:

"Rotation"	"Counterclockwise"	Sets the direction of rotation of the black hole. The default option is "Rotation"–> "Counterclockwise". The opposite is "Rotation"–> "Clockwise".
"PhiRange"	{-Infinity, Infinity}	Sets the range of output of the azimuthal angle. The default is "PhiRange"–> {–∞, ∞}, which starts the coordinate at 0 and does not take the modulus of it after full windings. Typical options could be {–π, π} or {0, 2π}, but other option values in the format {bottomvalue, topvalue} are valid as well.

Tech Notes

KerrNullGeodesics

Related Links

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See Also

KerrNullGeo ▪ **KerrNullGeoDistantFunction** ▪ ⊕

Related Guides

KerrNullGeodesics

Examples Initialization

```
Needs["BlackHoleImages`"]
```

Basic Examples

More Examples ▹

Compute a geodesic in geometry given by $a = 0.6$, with the initial values $\theta = \pi/3$, $\alpha = 6$, $\beta = 7$:

```
In[17]:= geod = KerrNullGeoDistant[0.6, π / 3, 6, 7];
```

Access the constant of motion ℓ and the escape coordinates θx, ϕx:

```
In[18]:= ℓ = geod["ConstantsOfMotion"]["ℓ"]
         {θx, ϕx} = geod["EscapeCoordinates"]
```

```
Out[18]= -3 √3
```

```
Out[19]= {2.52403, -3.96582}
```

Get the Boyer-Lindquist coordinates at Mino time λ=0.1:

```
In[20]:= geod[0.1]
```

```
Out[20]= {4.90212, 11.3013, 0.598116, -1.16209}
```

More Examples ⓘ

- Scope
- Generalizations & Extensions
- Options
  - "Rotation"
  - "PhiRange"
- Applications
- Properties & Relations
- Possible Issues
- Interactive Examples
- Neat Examples

Metadata

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Categorization ⓘ

Keywords

Syntax Templates