KerrNullGeo

KerrNullGeo[*a*, *xs*, *ps*]

returns a KerrNullGeoFunction which stores information about the trajectory of a light-ray starting from specified initial conditions. The black hole spin *a*, position *xs*, and wavevector *ps* are assumed to be given in units of the BH mass, unless mass M is specified (optional argument).

The following options can be given:

"Momentum"	"Momentum"	Specifies whether the user provided 4 - momentum or wave 4 - vector as ps. The default option is "Momentum" -> "Momentum". If the user provided the wave 4 - vector, the option "Momentum" -> "WaveVector" should be specified.
"PhiRange"	{-Infinity, Infinity}	This 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

XXXX

See Also

KerrNullGeoDistant ▪ **KerrNullGeoFunction** ▪ ⊕

Related Guides

KerrNullGeodesics

Examples Initialization

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

Basic Examples

More Examples ▹

Compute a geodesic in geometry given by $a = 0.9$, with some initial position and momentum:

```
In[13]:= geod = KerrNullGeo[0.9, {0, 150, π / 3, 0}, {-1, -1, Sqrt[10], 10}];
```

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

```
In[14]:= ℓ = geod["ConstantsOfMotion"]["ℓ"]
         {θx, ϕx} = geod["EscapeCoordinates"]
Out[14]= 10

Out[15]= {1.99164, 3.49568}
```

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

```
In[16]:= geod[0.1]
Out[16]= {151.55, 12.0111, 1.60014, 1.12364}
```

More Examples ⓘ

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

Metadata

New in: XX | Modified in: | Obsolete in:

Categorization ⓘ

Keywords

Syntax Templates