

## Reviews

- ① Spacetime
- ② Geodesics
- ③ Schwarzschild Geometry

### ① Spacetime

- Lorentzian signature!
- connectors, curvature
- • (hyperbolic) rotations between  
& other orthormal frames
- line elements ( $ds^2 = d\vec{r} \cdot d\vec{r}$ )

### ② Geodesics

- Killing vectors, symmetries
- preferred "affine" parameters:  
arclength, proper time
- • finding geodesic eq  
(using symmetry)
- constants of motion

### ③ Schwarzschild

- rain > coords/observers
- shell
- "far-away"
- extensions
- radius - physics  
& geometry
- units! mass in meters  
time in meters

⑨ Suppose line element is given  
what next?

- $d\vec{r}$  &  $\vec{v} = d\vec{r}/d\lambda = \dot{\vec{r}}$
- symmetries
- geodesic eq (& solutions?)
- where is spacetime  
badly behaved?

(• connection / curvature)

↑  
Killing eq    or    use  
geodesic eq    —    shortcut