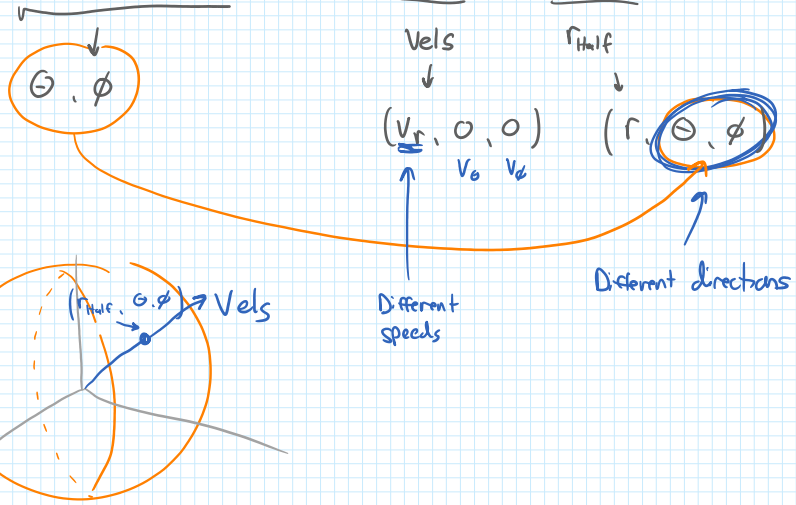
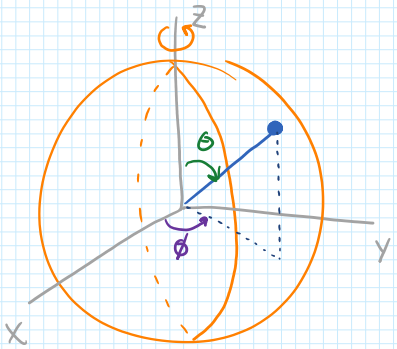
Want "random" directions for each velocity and position

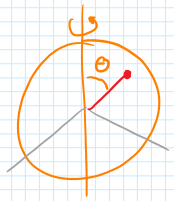


Where is ϕ & Theta ?

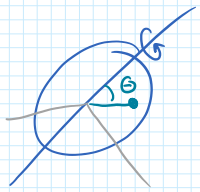
Defined relative to the SUN



This might change for Earth if the spin of Earth is tilted relative to the spin of the sun.



Sun Coordinates



Earth coordinates

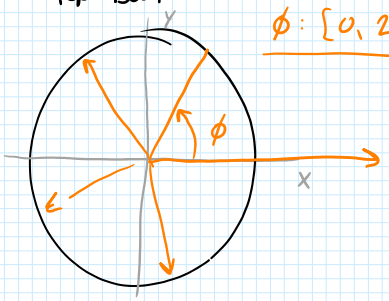
What changes with our code

V_x V_y V_z → V_r, 0, 0

x, y, z → r, #, #

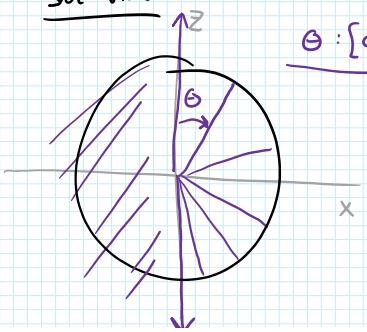
random

Top Down

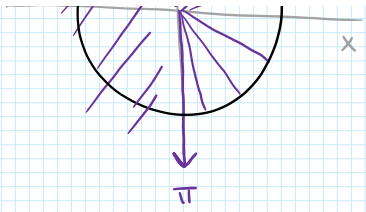


$\phi : [0, 2\pi]$

Side view



$\theta : [0, \pi]$

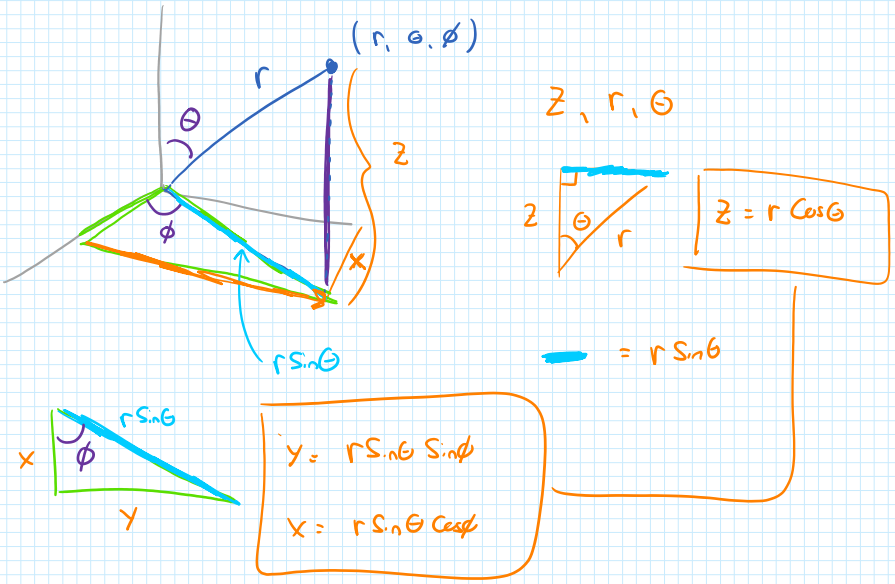


Have r_{Half} , V_r ← list

For each V_r , assign $\vec{r}_0 = (r_{Half}, \#, \#)$

↓

$(V_r, 0, 0)$



What we did today

Redo our initial conditions in spherical instead of Cartesian

Easier for physics intuition

Easy for us to get code working

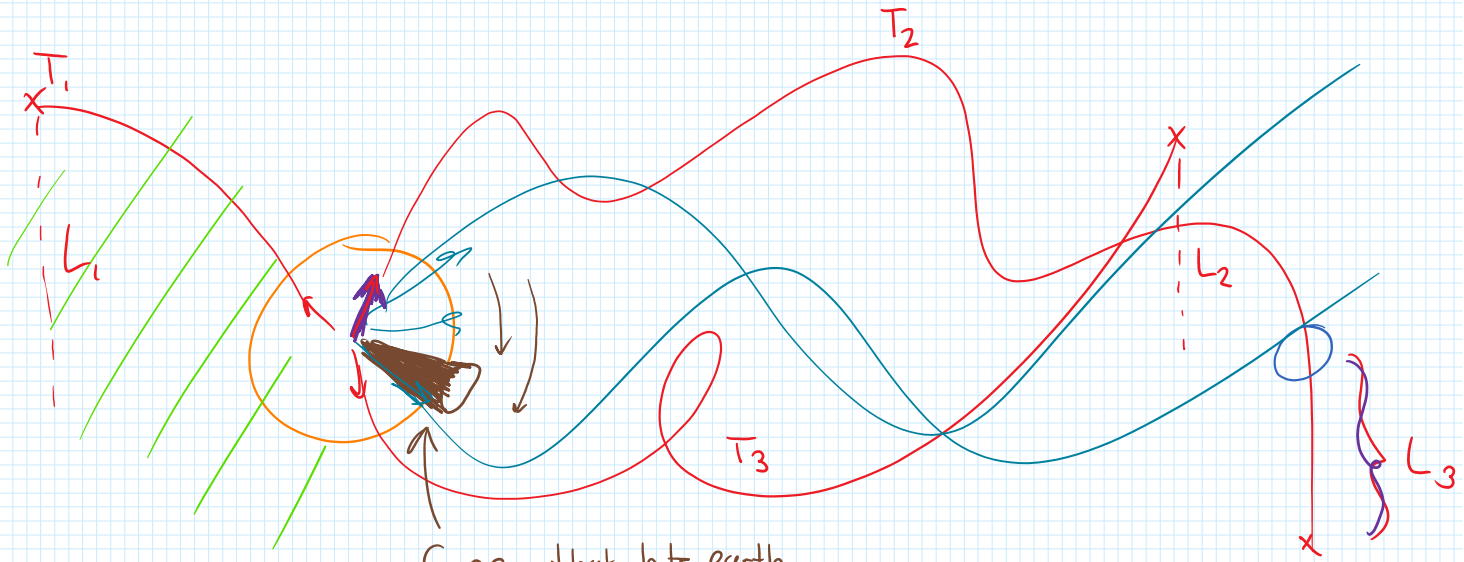
Computed loss for each condition

Train our machine learning algorithm

Tested the accuracy

There will be same set of conditions → Direction + Speed

where the loss is minimized



Cone that hits earth

$(r, \theta_{max}, \phi_{max})$

$(r, \theta_{min}, \phi_{min})$