



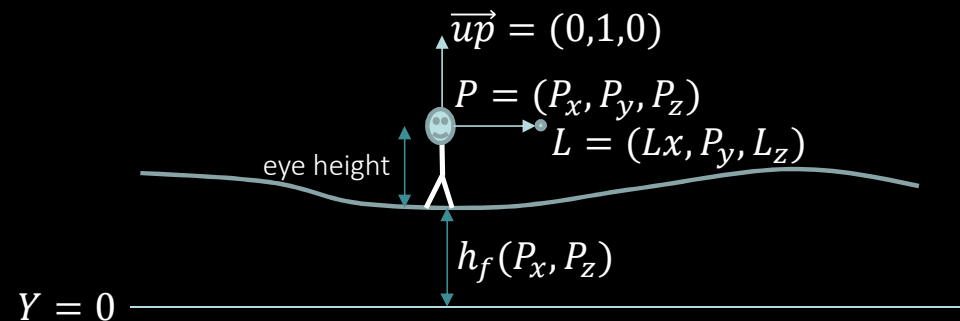
## Camera Control

First person camera on a terrain



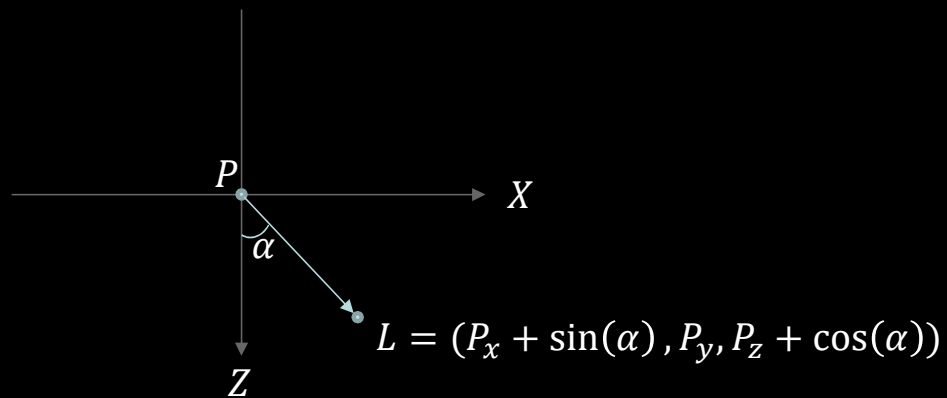
## Camera Placement

- Consider `gluLookAt` parameters:
  - $P$ : camera position;  $L$ : “look at” point;  $\vec{up}$ : up vector
- The  $P_y$  value of the camera position is taken directly from the terrain height + the height of the “user” eyes.
  - Use function `hf(x, z)`  $P_y = \text{eye height} + hf(P_x, P_z)$
- Assume that the user is always looking in an horizontal direction.  $L_y = P_y$





## Camera Orientation





## Forward/Backward Motion



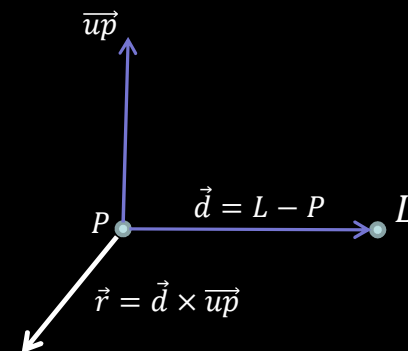
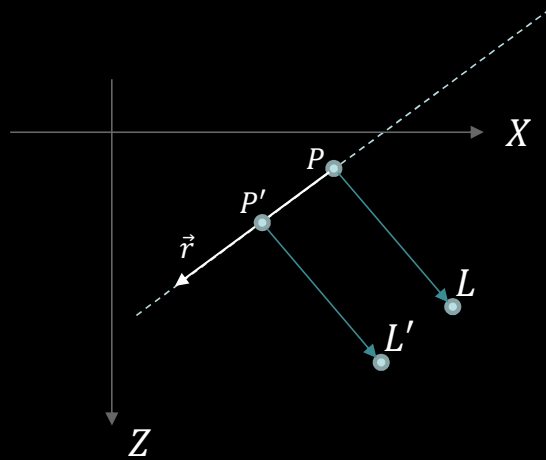
$$\vec{d} = L - P = (L_x - P_x, 0, L_z - P_z)$$

$$P' = P + k\vec{d}$$

$$L' = L + k\vec{d}$$



## Camera Lateral Motion



$$\begin{aligned} P' &= P + k\vec{r} \\ L' &= L + k\vec{r} \end{aligned}$$



# Assignment

- Add first person camera to the project.
  - Camera must follow the terrain (slide 2)
  - Allow camera to look around (slide 3)
  - Move forward and backward (slide 4)
  - Move sideways (slide 5)