

Lecture 22: Image Based Rendering – Review Questions

- A stationary one-eyed observer is unable to perceive depth. Explain why. What if the observer moves (or opens a second eye)?
- Interestingly, if you close one eye and sit still, you can still perceive the world as having 3D depth. Why?
- What is the Plenoptic Function. What does it capture?
- Explain the idea behind Quicktime VR.
- Ignoring time and wavelength, the Plenoptic function is 5D. However, a lightfield representation (also known as Lumigraph) is only 4D. How is this dimensionality reduction possible? What assumption is being made? Give examples when this assumption will not hold.
- A lightfield can be parameterized by a 4-tuple of numbers: either two pairs of x,y positions, or an x,y pair and two angles. Draw these two cases and show that they are equivalent.
- How can we capture a lightfield for a given scene?
- How do we render an image for a new camera viewpoint, given this representation?
- Give some pros and cons of the lightfield approach vs. the other rendering techniques we have seen in class.
- For what types of scenes is image based rendering especially well suited?
- Describe the design of Ren Ng's portable lightfield camera. How do you use the resulting lightfield to refocus a photo? Move the viewpoint?