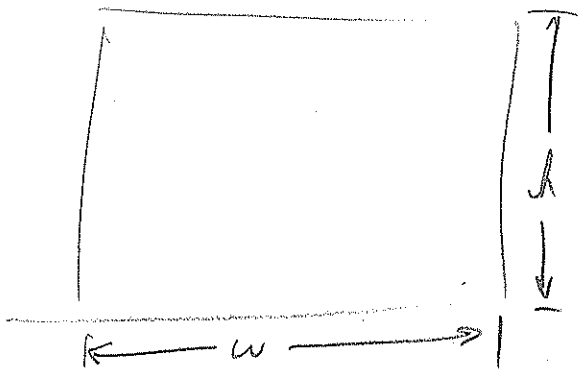
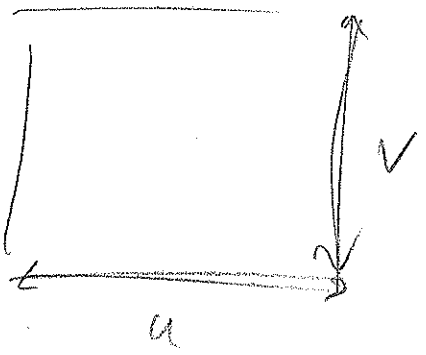
Lecture 7

Box or Planar mapping

$[0,1]^2$





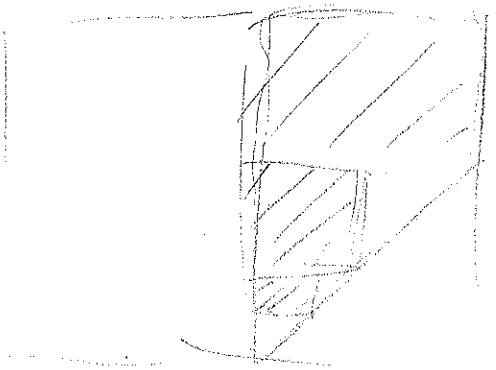
$$x = w \cdot u$$
$$y = h \cdot v$$

Mipmap storage

$$\frac{1}{3} = \frac{1}{2^2} + \frac{1}{2^4} + \frac{1}{2^6} + \frac{1}{2^8} + \dots$$

$$S = \sum_{k=1}^{\infty} \frac{1}{2^{2k}}$$

$$2^2 S = \sum_{k=1}^{\infty} \frac{2^2}{2^{2k}} = \sum_{k=1}^{\infty} \frac{1}{2^{2(k-1)}}$$

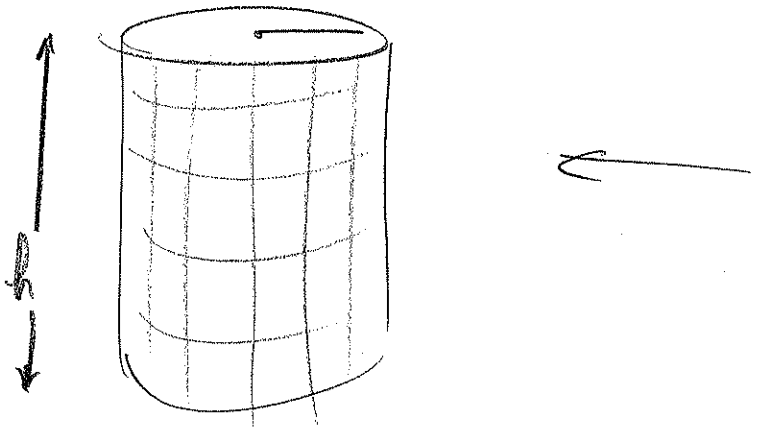


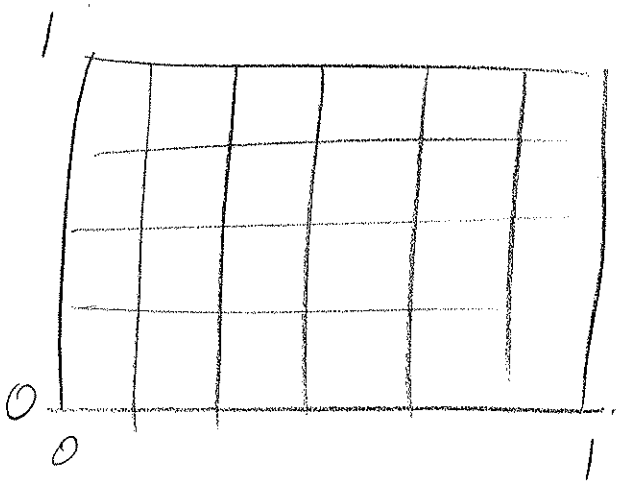
$$= \sum_{k=0}^{\infty} \frac{1}{2^{2k}}$$

$$2^2 S - S = \sum_{k=0}^{\infty} \frac{1}{2^{2k}} - \sum_{k=1}^{\infty} \frac{1}{2^{2k}} = 1$$

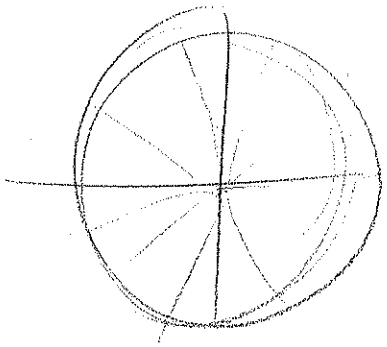
$$S(4-1) = 1 \quad \Rightarrow \quad 3S = 1 \quad \Rightarrow \quad S = \frac{1}{3}$$

Cylindrical Mapping





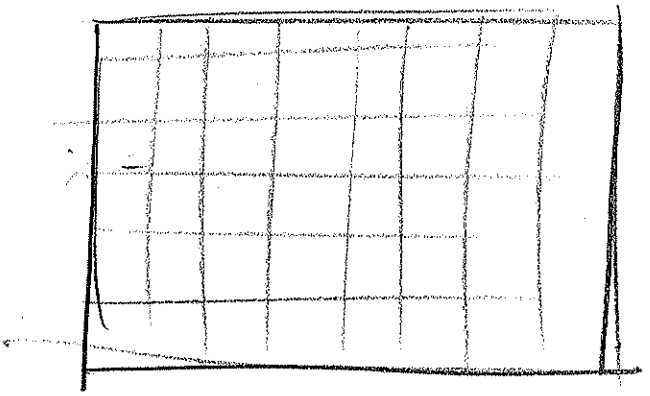
$$x = r\cos 2\pi u$$
$$y = r\sin 2\pi u$$
$$z = hv$$

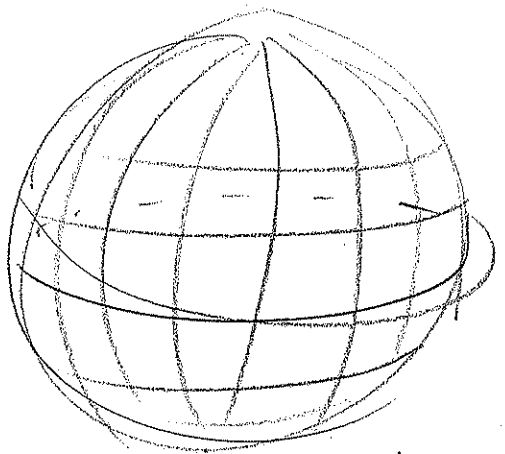


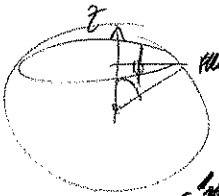
Shperical Map

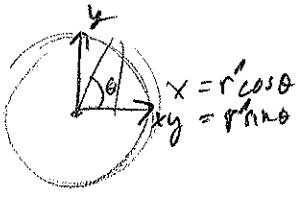
$\theta = 2\pi u$

$\phi = \pi v$



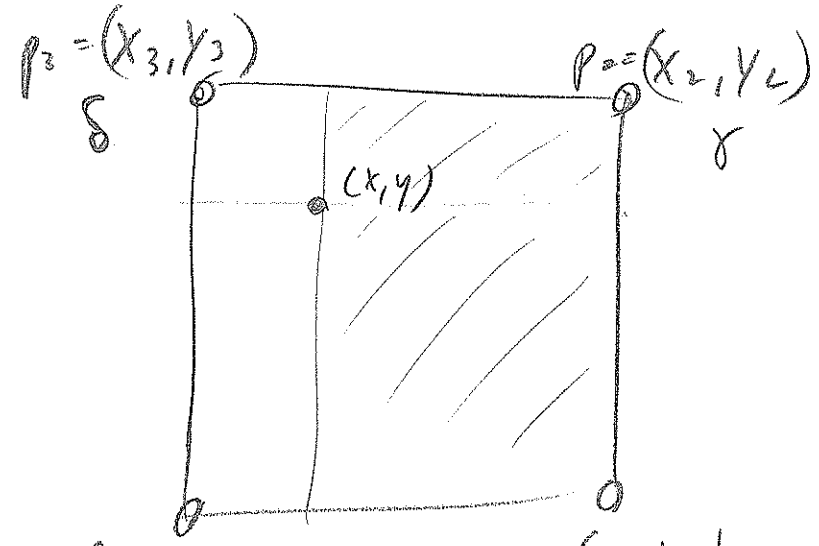






$$x = r'\cos\theta = r\sin\phi\cos\theta$$
$$y = r'\sin\theta = r\sin\phi\sin\theta$$
$$z = r\cos\phi = r\cos\phi$$

Bilinear Interpolation



$$p = \alpha p_0 + \beta p_1 + \gamma p_2 + \delta p_3$$

α = area of subrectangle opposite p_0

β = " p_1

γ = " p_2

δ = " p_3