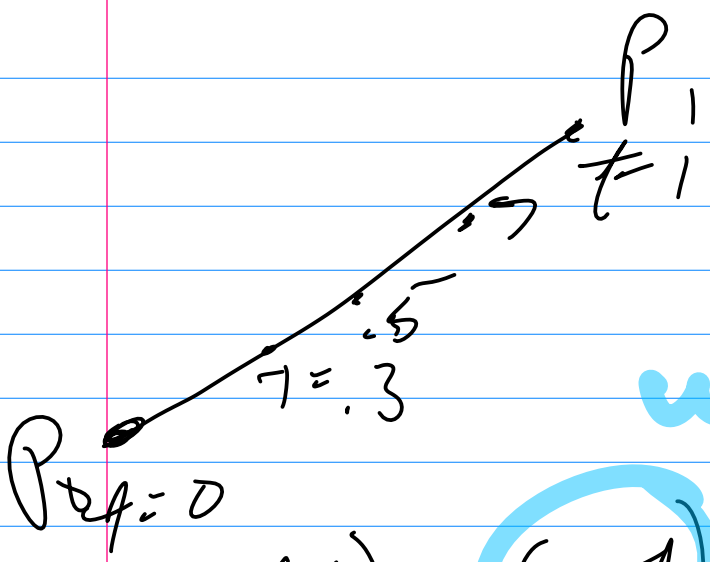
12/1/14 p1



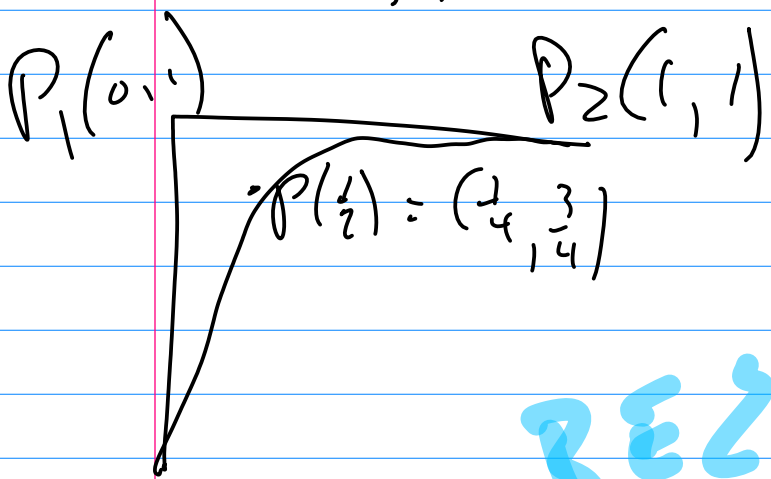
WEIGHTS

$$P(t) = (1-t)P_0 + tP_1$$

$$P(0) = P_0 \qquad P(1) = P_1$$

$$P\left(\tfrac{1}{2}\right) = \tfrac{1}{2}P_0 + \tfrac{1}{2}P_1$$

$$P\left(\tfrac{2}{3}\right) = \tfrac{1}{3}P_0 + \tfrac{2}{3}P_1$$



BEZIER

$$P(t) = (1-t)^2 P_0 + 2t(1-t)P_1 + t^2 P_2$$

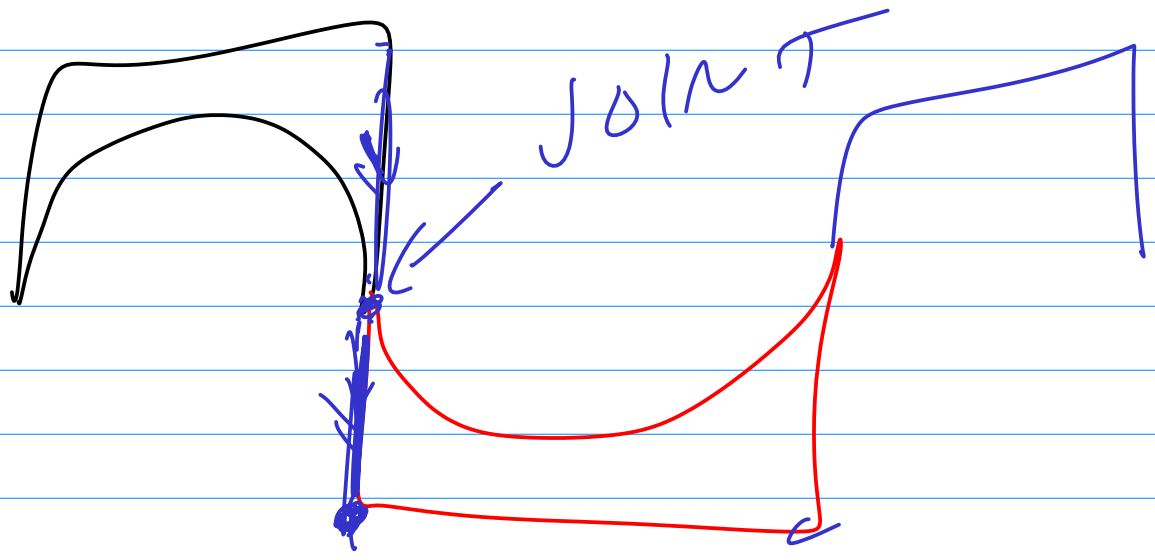
$$P\left(\tfrac{1}{2}\right) = \tfrac{1}{4}P_0 + \tfrac{1}{2}P_1 + \tfrac{1}{4}P_2$$

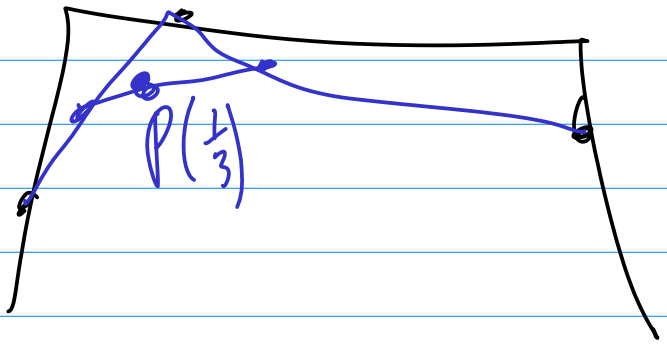
CUBIC BEZIER

4 CONTROL PTS $P_0\ P_1\ P_2\ P_3$

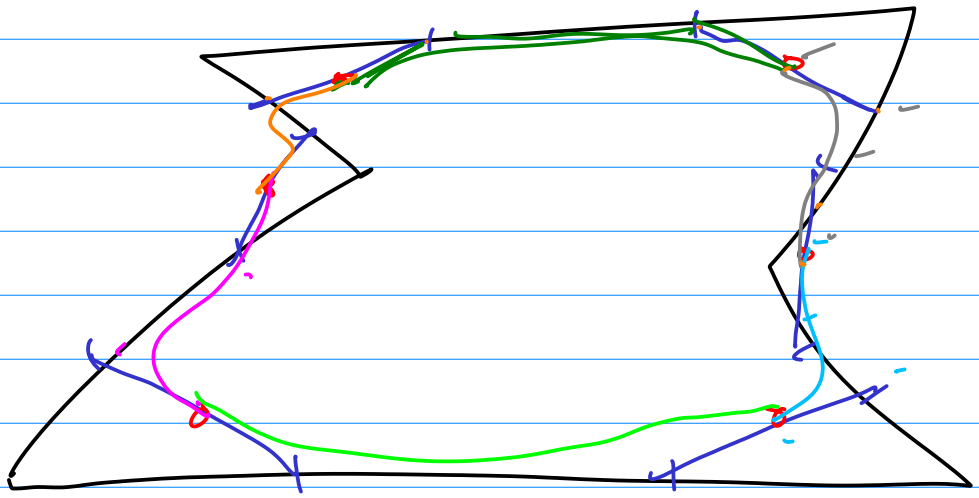
$$P(t) = (1-t)^3 P_0 + 3(1-t)^2 t P_1 + 3(1-t) t^2 P_2 + t^3 P_3$$

$$P(t) = \sum_{i=0}^{3} \binom{3}{i} t^i (1-t)^{3-i} P_i$$



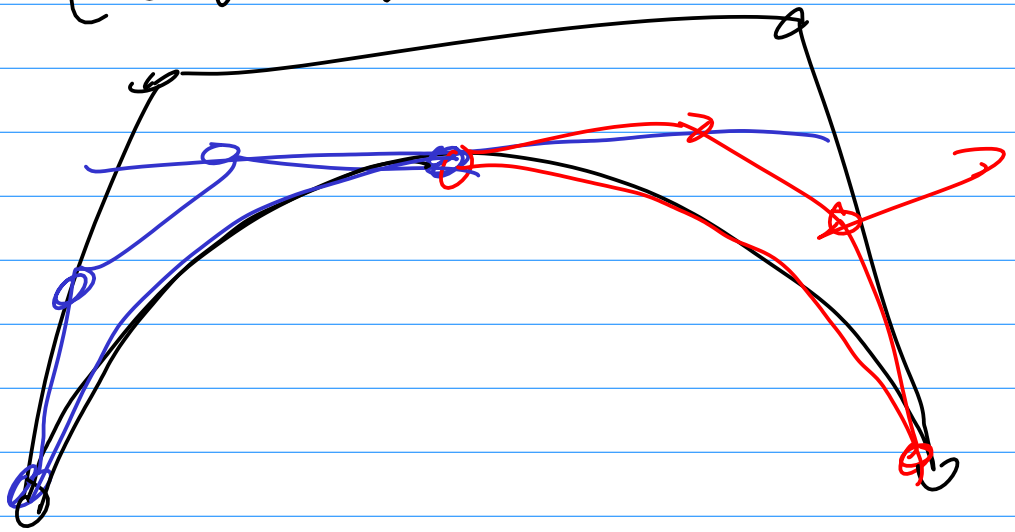


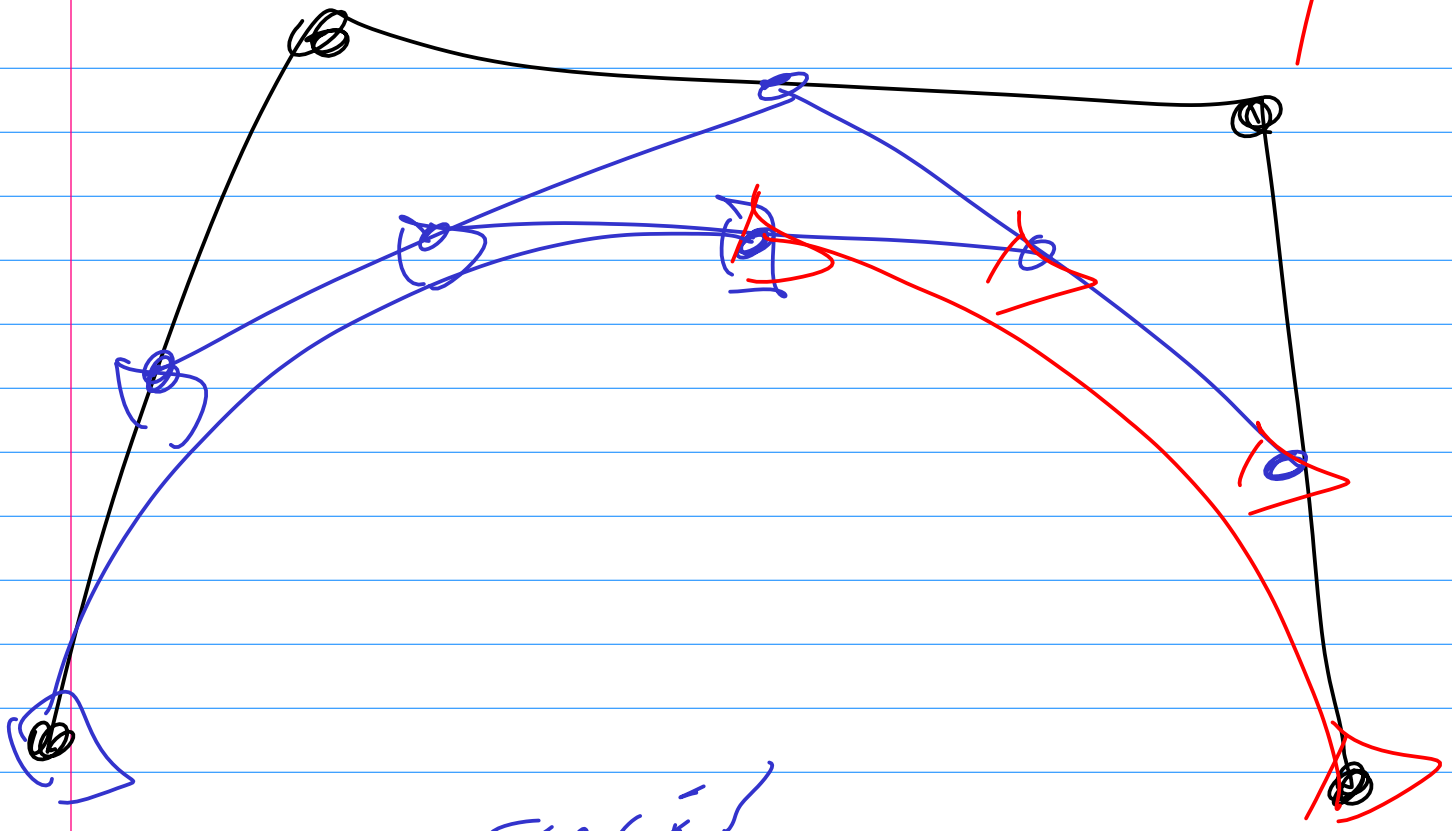
FINDING CONTROL POLIGON OF EACH BEZIER PIECE OF A B-SPLINE



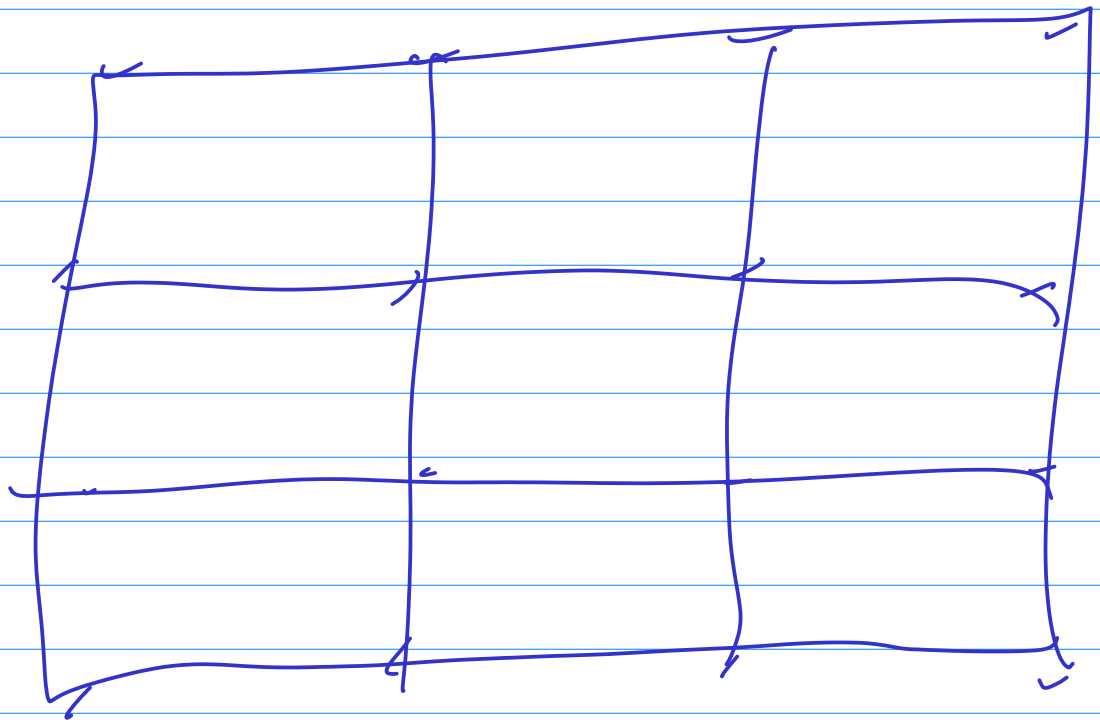
NURBS

YOU CAN ADD NEW CONTROL POINTS





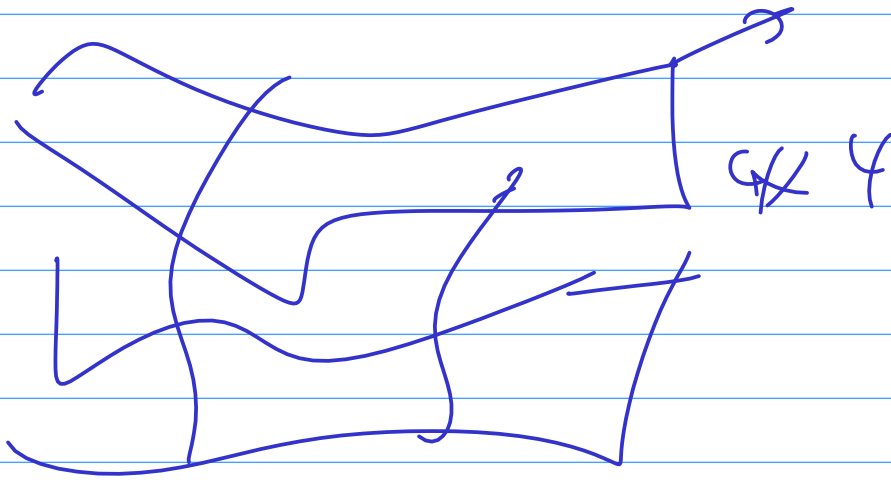
SURFACE / CONTROL GRID



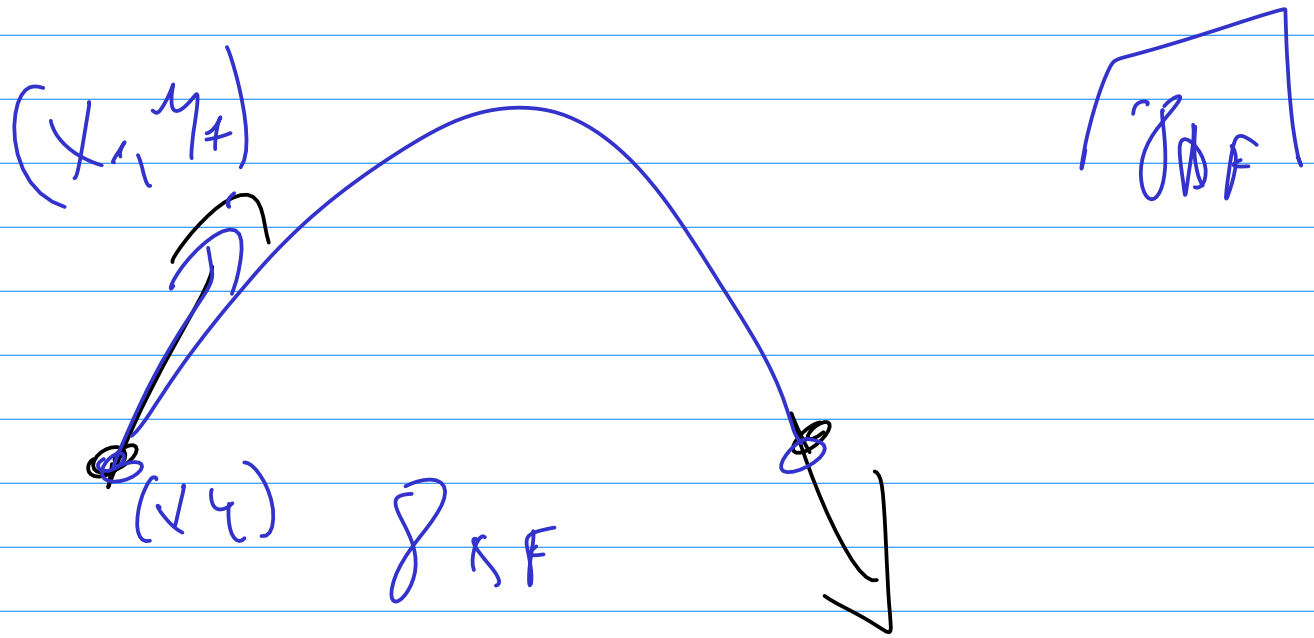
CUBIC BEZIER PATCH

16 CONTROL POINTS

$$P(u,v) = \sum_{q=0}^{3}\sum_{j=0}^{3} \binom{3}{q}\binom{3}{j}(1-u)^{3-q}(1-v)^{3-j}\, u^q v^j P_{qj}$$



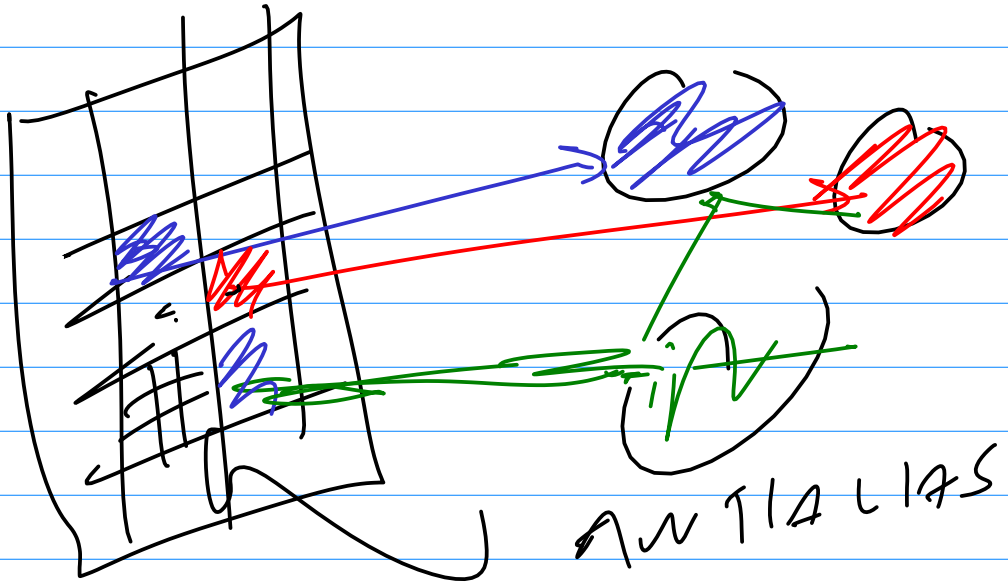
HERMITE CURVE



- ENDPOINTS + DERIVATIVES

RAY TRACING

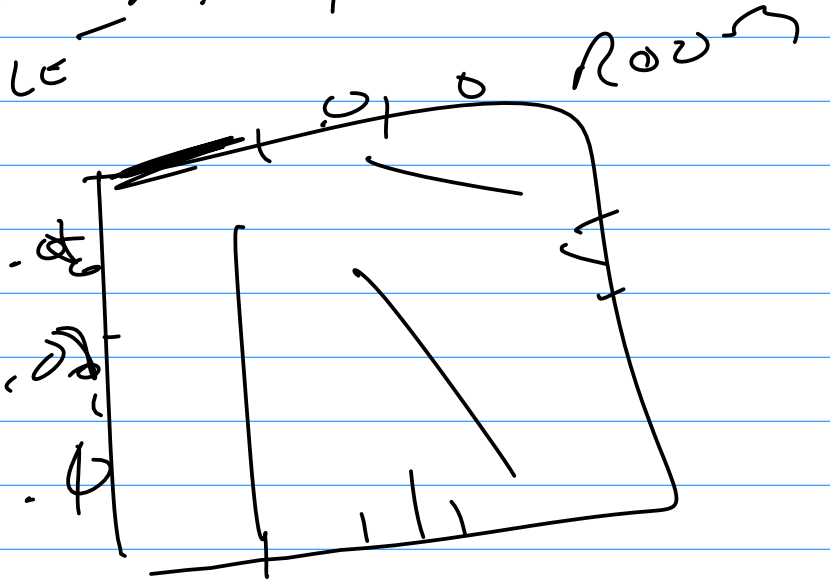
RADIOSITY



- SUBPIXEL AVERAGING
  ADAPTIVE
- STOCHASTIC RT

RADIOSITY

2D EXAMPLE



F_{ij} = FRACT OF LIGHT FROM A_i HITTING A_j

FORM FACTOR

SET UP LINEAR SYSTEM

SOLVE FOR BRIGHTNESSES