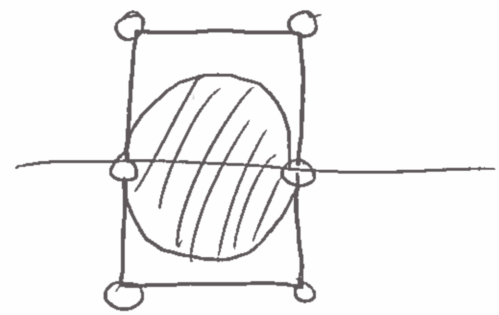
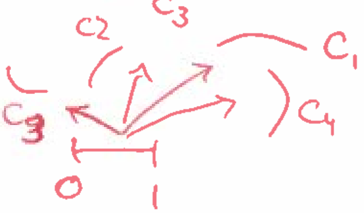
$$\left[\cancel{\binom{n}{i}}(1-t)^{n-i}\,t^{i}\right]\cdot\left[\cancel{\binom{m}{j}}(1-t)^{m-j}\,t^{j}\right] = ?$$

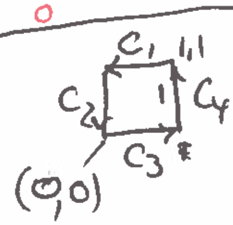
$$= \frac{(1-t)^{n+m-(i+j)}\,t^{i+j}\binom{n+m}{i+j}}{\binom{n+m}{i+j}} \qquad (1-t)^{n+m-(i+j)}\,t^{i+j}\binom{n+m}{i+j} = B^{n+m}_{i+j}$$



Area $= \int_\Omega x(t)\,y'(t)\,dt$

$$= \boxed{\sum_{i=1}^{4}\int_0^1 x_i(t)\,y_i'(t)\,dt}$$





$$\overbrace{0\cdot\underbrace{y_2'(t)}_{-1}}^{0} + 1\cdot\underbrace{y_4'(t)}_{1} = 1$$

$$\frac{B^n_i}{\binom{n}{i}}\cdot\frac{B^m_j}{\binom{m}{j}} = \frac{B^{n+m}_{i+j}}{\binom{n+m}{i+j}}$$

$$x(t) := \sum \overset{x_i}{\cancel{c_i}}\, B^n_i \qquad z(t) := x(t)\cdot y(t) = \sum \cancel{c_k}\, B^{n+m}_{i+j}$$

$$y(t) := \sum \underset{y_j}{\cancel{c_j}}\, B^m_j$$

z_{i+j} ← Ravi's preference

$$z_k = \sum_{i+j=k} x_i\cdot y_j\left(\frac{\binom{n}{i}\binom{m}{j}}{\binom{n+m}{i+j}}\right)$$

Daniel's Question:

$n=1 \quad m=2 \qquad \binom{n}{i}=1 \quad \binom{m}{j}=2$

$i=0 \quad j=1$

$n+m=3 \qquad \binom{n+m}{i+j}=3$

$i+j=1$

degree - raising

$1 + 2t + 5t^2 + 0t^3$

$$\Big[\underbrace{(1-t)+t}_{\underbrace{1\cdot B_0^1 + 1\cdot B_1^1}_{1}}\Big]\cdot\Big[0B_0^2 + 1B_1^2 + 0B_2^2\Big]$$

$$B_i^n(t) = \binom{n}{i}(1-t)^{n-i}t^i$$

$$A \quad (1, 1)\cdot(0, 1, 0)$$

$$\binom{1}{0}\ \binom{1}{1} \qquad \binom{2}{0}\ \binom{2}{1}\ \binom{2}{2}$$

$$B \quad (1, 1)\cdot(0, 2, 0)$$

$$\qquad\qquad\quad 0 \quad 1 \quad 2$$

$$C \quad \left(\frac{0}{\binom{3}{0}}, \frac{2+0}{\binom{3}{1}}, \frac{1\cdot 0+2}{\binom{3}{2}}, \frac{0}{\binom{3}{3}}\right)$$

$$D \quad \left(0, \frac{2}{3}, \frac{2}{3}, 0\right)$$

$$\quad 0 \quad 1 \quad 2 \quad 3$$