Homework 7 answers: 155A - Winter 2020

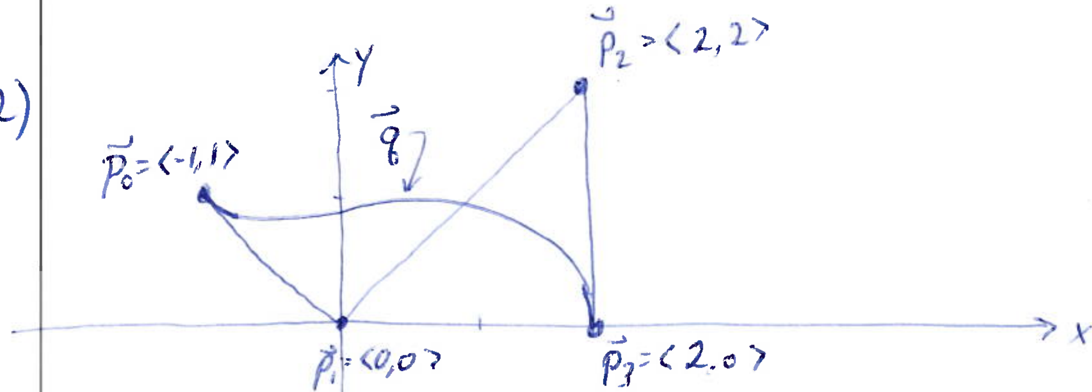
1) Red is: Magenta + Yellow

Black is: Cyan, Magenta + Yellow

Magenta is: Blue + Red

White is Red + Green + Blue

2)



$\vec{q}(0) = \langle -1, 1 \rangle$

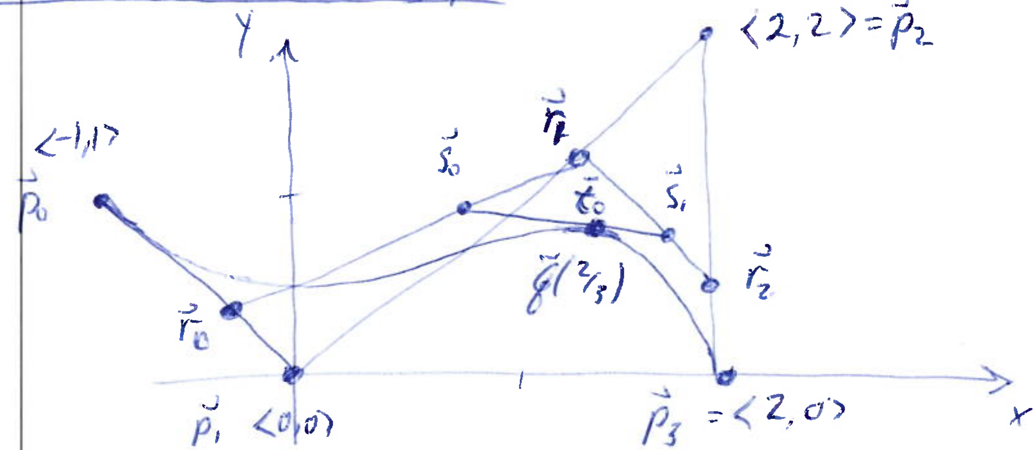
$\vec{q}(1) = \langle 2, 0 \rangle$

$q'(0) = 3(\vec{p}_1 - \vec{p}_0) = \langle 3, -3 \rangle$

$q'(1) = 3(\vec{p}_3 - \vec{p}_2) = \langle 0, -6 \rangle$

HW7 answers - continued (p 2)

3)



$\vec{r}_0 = lerp(\vec{p}_0, \vec{p}_1, 2/3) = \langle -1/3, 1/3 \rangle$

$\vec{r}_1 = lerp(\vec{p}_1, \vec{p}_2, 2/3) = \langle \frac{4}{3}, 4/3 \rangle$

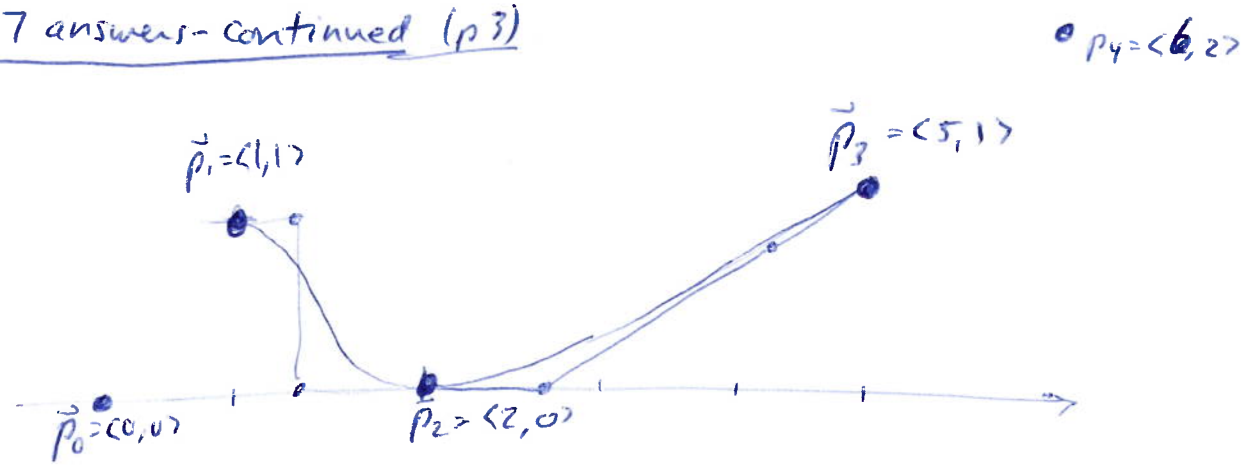
$\vec{r}_2 = lerp(\vec{p}_2, \vec{p}_3, 2/3) = \langle 2, 2/3 \rangle$

$\vec{s}_0 = lerp(\vec{r}_0, \vec{r}_1, 2/3\rangle = \langle \frac{7}{9}, 1 \rangle$

$\vec{s}_1 = lerp(\vec{r}_1, \vec{r}_2, 2/3\rangle = \langle \frac{16}{9}, \frac{8}{9} \rangle = \langle 1\frac{7}{9}, \frac{8}{9} \rangle$

$\vec{t}_0 = lerp(\vec{s}_0, \vec{s}_1, 2/3\rangle = \langle \frac{39}{27}, \frac{25}{27} \rangle = \langle \frac{13}{9}, \frac{25}{27} \rangle = \langle 1\frac{4}{9}, \frac{25}{27} \rangle$

4)



$\vec{q}\,'(0) = \langle 1, 0\rangle$ $\qquad$ $\vec{q}\,'(1) = \langle 2, 0\rangle$ $\qquad$ $\vec{q}\,'(2) = \langle 2, 1\rangle$

$\vec{q}(0) = p_1 = \langle 1, 1\rangle$ $\qquad$ $\vec{q}(1) = \langle 2, 0\rangle$ $\qquad$ $\vec{q}(2) = \langle 2, 0\rangle$

First piece has control points

$$\vec{p}_1, \quad \vec{p}_1 + \tfrac{1}{3}\langle 1, 0\rangle, \quad \vec{p}_2 - \tfrac{1}{3}\langle 2, 0\rangle, \quad \vec{p}_2$$

namely: $\langle 1, 1\rangle, \ \langle \tfrac{4}{3}, 1\rangle, \ \langle \tfrac{4}{3}, 0\rangle, \ \langle 2, 0\rangle$

Second piece has control points

$$\vec{p}_2, \quad \vec{p}_2 + \tfrac{1}{3}\langle 2, 0\rangle, \quad \vec{p}_3 - \tfrac{1}{3}\langle 2, 1\rangle, \quad \vec{p}_3$$

namely

$\langle 2, 0\rangle, \ \langle \tfrac{5}{3}, 0\rangle, \ \langle 4\tfrac{1}{3}, \tfrac{2}{3}\rangle, \ \langle 5, 1\rangle$

5) Many possible answers. Two examples.

(a) $\vec{q}$ has control points

$$\langle -3,0\rangle, \langle -2,0\rangle, \langle -1,0\rangle, \langle 0,0\rangle$$

and $\vec{r}$ has control points

$$\langle 0,0\rangle, \langle \tfrac{1}{2},0\rangle, \langle 2,0\rangle, \langle 3,0\rangle.$$

(b) $\vec{q}$ has control points

$$\langle -2,0\rangle, \langle -1,0\rangle, \langle 0,0\rangle, \langle 0,0\rangle$$

and $\vec{r}$ has control points

$$\langle 0,0\rangle, \langle 0,0\rangle, \langle 0,1\rangle, \langle 0,2\rangle.$$