

6.819 PSET 3
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1 Motion Magnification

a.

Motion magnification of image A to b

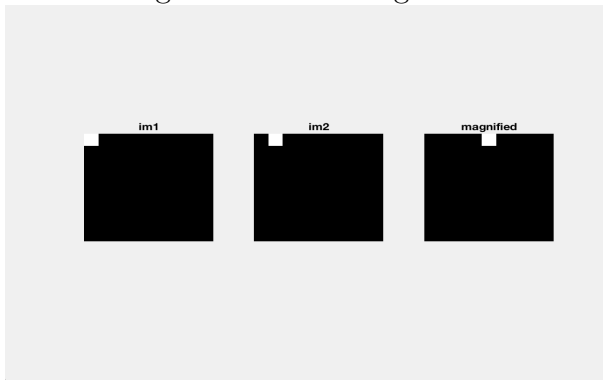
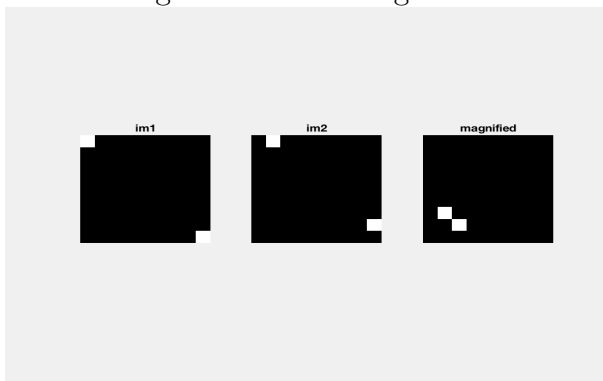


Image of magnification

Motion magnification of image A to b



b. Reason offsets are not properly magnified

The phase shift happening in *a* is been done for one shape while *b* has 2 boxes hence , the boxes will move to try and find a global phase shift since the phase shift from the magnifyChange function is only applied to one box hence it will have a problem knowing which image to apply the phase shift to

c.

Gaussian Motion magnification

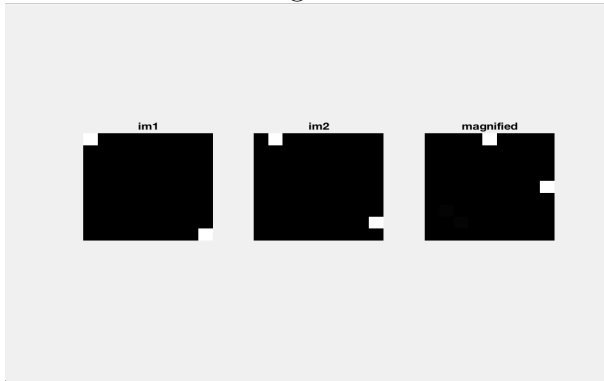


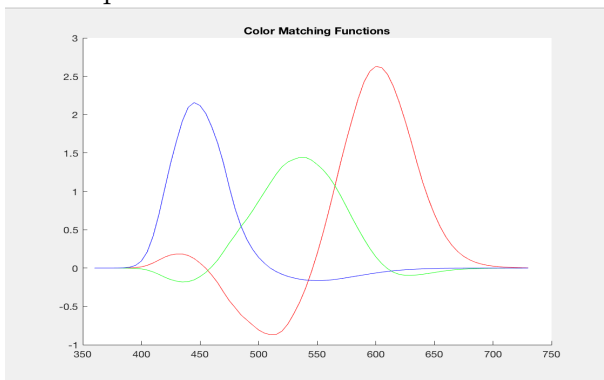
Image of magnification

2 Color

a.

i.

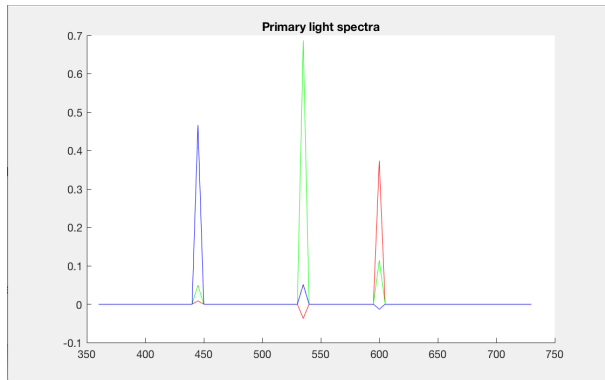
Color spectra



Positivity : The blue spectrum is fairly non-negative , the green spectrum is negative between about $400nm$ and $460nm$ and non-negative otherwise , the red spectrum is negative between 450 and $550nm$ and non-negative otherwise

ii.

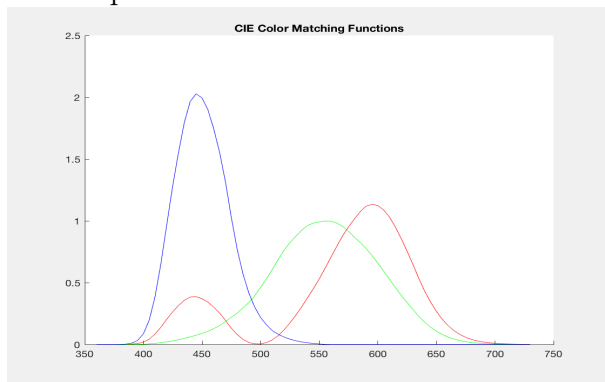
Primary Spectra



Positivity: At around 440nm , all three are non-negative at around 530nm , the green and blue primaries are non-negative, the red primary is negative, at around 600nm , the red and green primaries are non-negative, the blue spectra is negative

iii.

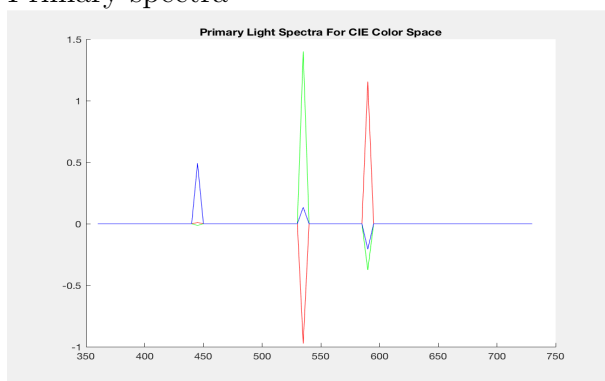
Color Spectra



Positivity: All three spectra are non-negative

iv.

Primary spectra

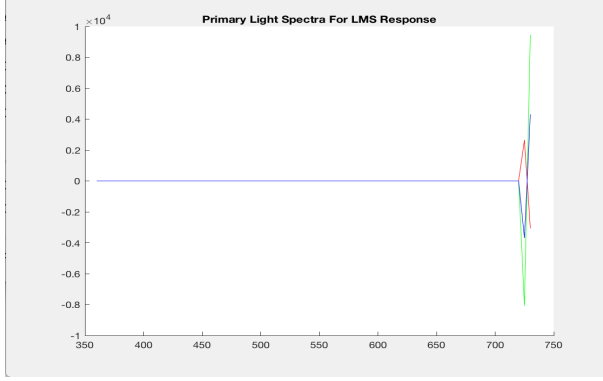


Positivity: At around 440nm , blue and red are non-negative, green is neg-

ative at around 530nm, the green and blue primaries are non-negative , the red primary is negative ,at around 600nm , the red primary is non-negative,the blue and green spectra are negative

b.

LMS Response Spectra



Positivity: All three spectra are both negative and positive ie.they have negative and positive components

c.

$$C.P = I$$

$$C = \begin{bmatrix} L^T \\ M^T \\ S^T \end{bmatrix} = \begin{bmatrix} A_0 & A_1 & \dots & \dots & A_n \\ B_0 & B_1 & \dots & \dots & B_n \\ C_0 & C_1 & \dots & \dots & C_n \end{bmatrix} \quad P = \begin{bmatrix} p_{11} & p_{12} & p_{13} \\ p_{21} & p_{22} & p_{23} \\ p_{31} & p_{32} & p_{33} \\ \dots & \dots & \dots \\ \dots & \dots & \dots \\ p_{n1} & p_{n2} & p_{n3} \end{bmatrix}$$

$\dim(C) = 3 \times n$, $\dim(P) = n \times 3$, hence $\dim(I) = 3 \times 3$

$$C.P = I = \begin{bmatrix} Ap_1 & Ap_2 & Ap_3 \\ Bp_1 & Bp_2 & Bp_3 \\ Cp_1 & Cp_2 & Cp_3 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$Ap_1 = 1, Ap_2 = 0, Ap_3 = 0 \implies A = \frac{1}{p_1} = \frac{p_1}{\|p_1\|^2} \geq 0$$

$$Bp_1 = 0, Bp_2 = 1, Bp_3 = 0 \implies B = \frac{1}{p_2} = \frac{p_2}{\|p_2\|^2} \geq 0$$

$$Cp_1 = 0, Cp_2 = 0, Cp_3 = 1 \implies C = \frac{1}{p_3} = \frac{p_3}{\|p_3\|^2} \geq 0$$