YIQ revisited

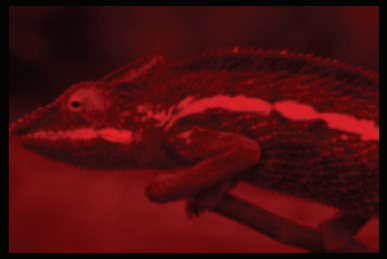
Recall from the image processing lecture how we computed the grayscale version of an image:

$$\begin{bmatrix} Y \\ I \\ Q \end{bmatrix} = \underbrace{\begin{bmatrix} 0.299 & 0.587 & 0.114 \\ 0.596 & -0.275 & -0.321 \\ 0.212 & -0.523 & 0.311 \end{bmatrix}}_{M_{RGB \to YIQ}} \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

Our visual system essentially encodes Y at high spatial resolution, and I and Q at low spatial resolution.

RGB image

RGB



(R,0,0)

(R,R,R)

(0,G,0)

(G,G,G)

(0,0,B)

(B,B,B)

RGB → YIQ

RGB

G

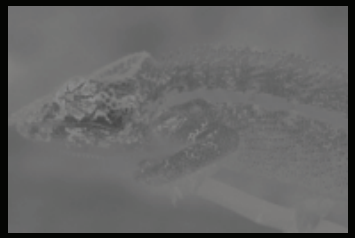
R

B

$M_{RGB \rightarrow YIQ}$

I (+128)

Y



Q (+128)

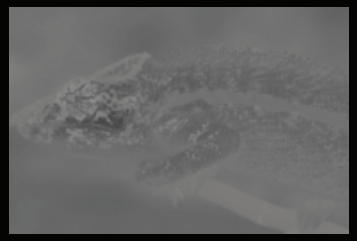
RGB → YIQ

RGB

$M_{RGB \rightarrow YIQ}$

Y

I (+128)



Q (+128)

RGB → YIQ → RGB

Y

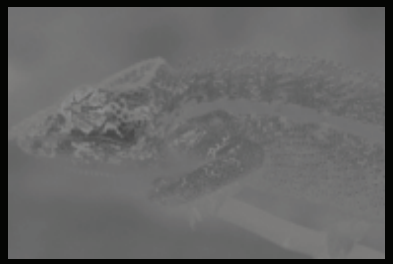
RGB

$M_{RGB \rightarrow YIQ}$

I (+128)

$M^{-1}_{RGB \rightarrow YIQ}$

RGB

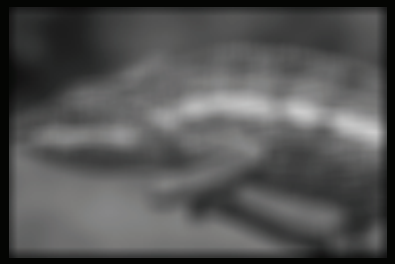


Q (+128)

Blurring the Y channel

Y

Y blur



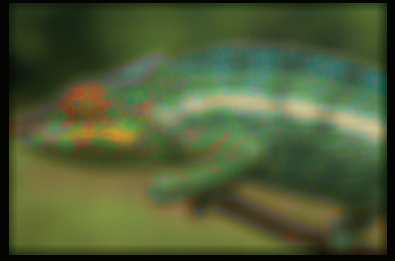
Y

RGB

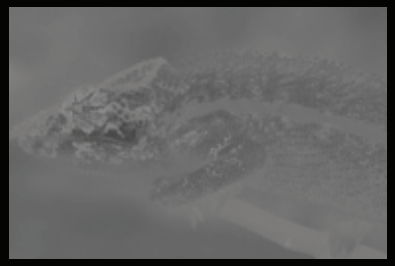
I (+128)

No change

I (+128)

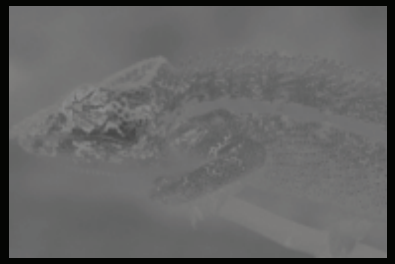


RGB



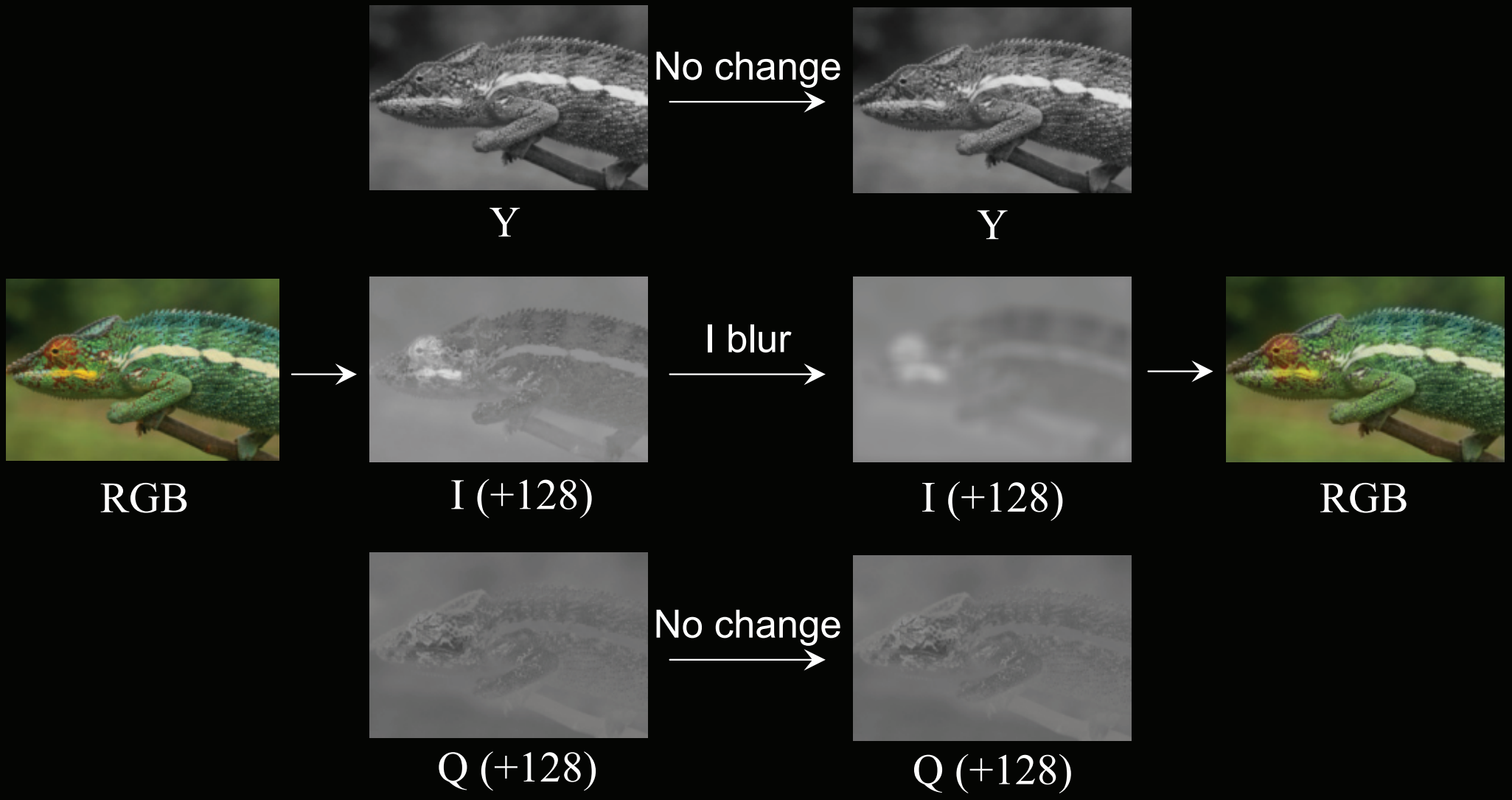
Q (+128)

No change

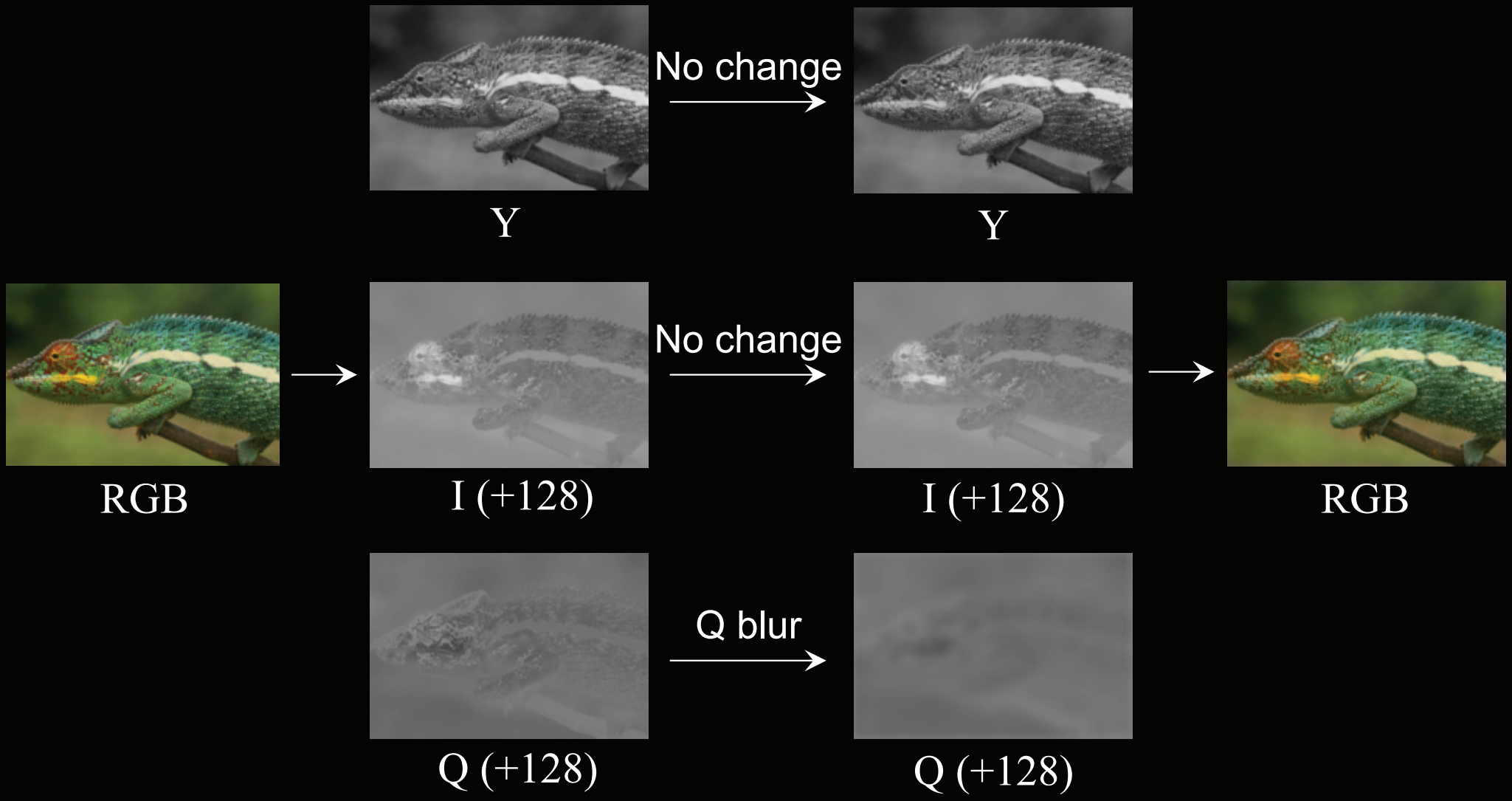


Q (+128)

Blurring the I channel



Blurring the Q channel

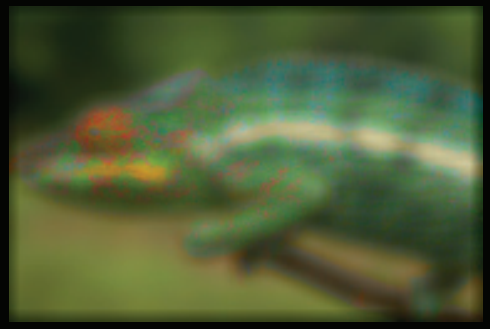


Blur comparison

OUTPUT

INPUT

RGB



RGB after Y blur

RGB after I blur

RGB after Q blur

Sharpen comparison

OUTPUT

INPUT

RGB

RGB after Y sharpen

RGB after I sharpen

RGB after Q sharpen