

## NTSC Space (YIQ)

Y=luminance      gray scale information  
I=hue  
Q=saturation

$$\begin{bmatrix} Y \\ I \\ Q \end{bmatrix} = \begin{bmatrix} 0.299 & 0.587 & 0.114 \\ 0.596 & -0.274 & -0.322 \\ 0.211 & -0.523 & 0.312 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

Note that sum of first row is one and sum of the second/third row is zero

yiql-image=rgb2ntsc(rgb-image)

$$\begin{bmatrix} R \\ G \\ B \end{bmatrix} = \begin{bmatrix} 1 & 0.956 & 0.621 \\ 1 & -0.272 & -0.647 \\ 1 & -1.106 & 1.703 \end{bmatrix} \begin{bmatrix} Y \\ I \\ Q \end{bmatrix}$$

rgb-image = ntsc2rgb(yiql-image)

## YCbCr Space

useful in video

Y=luminance      gray scale information  
Cb= difference between blue and reference value  
Cr= difference between red and reference value

$$\begin{bmatrix} Y \\ Cb \\ Cr \end{bmatrix} = \begin{bmatrix} 0.299 & 0.587 & 0.114 \\ 0.596 & -0.274 & -0.322 \\ 0.211 & -0.523 & 0.312 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \end{bmatrix}$$

Note that sum of first row is one and sum of the second/third row is zero

`ycbcr-image=rgb2ycbcr(rgb-image)`