

$$Y = 0.2126R + 0.7152G + 0.0722B$$

$$\begin{aligned} P_b &= \frac{1}{1.8556} (B - Y) & [1/1.8556 = 0.5389] \\ &= \frac{1}{1.8556} (-0.2126R - 0.7152G + 0.9278B) \\ &= -0.1146R - 0.3854G + 0.5000B \end{aligned}$$

$$\begin{aligned} P_r &= \frac{1}{1.5748} (R - Y) & [1/1.5748 = 0.6350] \\ &= \frac{1}{1.5748} (0.7874R - 0.7152G - 0.0722B) \\ &= 0.5000R - 0.4542G - 0.04585B \end{aligned}$$

$$Y = xR + yG + zB \quad [x + y + z = 1]$$

$$\begin{aligned} P_b &= -\frac{x}{2(x+y)}R - \frac{y}{2(x+y)}G + \frac{1}{2}B \\ P_r &= \frac{1}{2}R - \frac{y}{2(y+z)}G - \frac{z}{2(y+z)}B \end{aligned}$$

