Grayscale Transformations and the Histogram

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Figure 6-7

$Dm := 255 \qquad x := 0 .. Dm \qquad \alpha := 1.0$

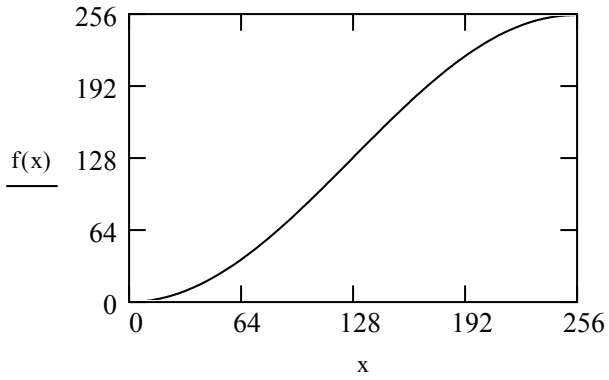
$\sigma 1 := 10 \qquad \sigma 2 := 20 \qquad \mu 1 := 64 \qquad \mu 2 := 180$

$$f(x) := \frac{Dm}{2}\cdot\left[1 + \frac{1}{\sin\left(\frac{\alpha\cdot\pi}{2}\right)}\cdot\sin\left[\alpha\cdot\pi\cdot\left(\frac{x}{Dm} - \frac{1}{2}\right)\right]\right]$$

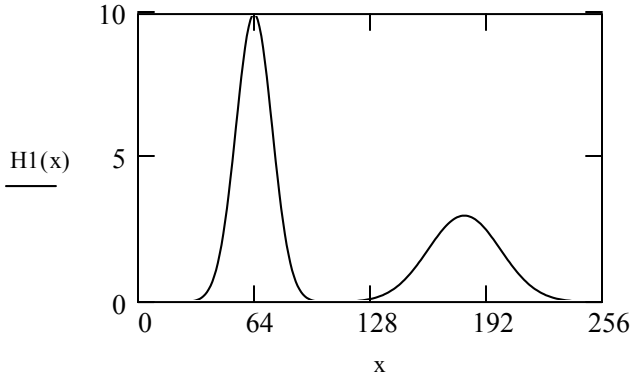
$$G(\sigma,\mu,x) := e^{\left[0 - \frac{(x-\mu)^2}{2\cdot\sigma^2}\right]}$$

$$H1(D) := 10\cdot G(\sigma 1,\mu 1,D) + 3\cdot G(\sigma 2,\mu 2,D)$$

$$finv(x) := \frac{Dm}{2} + \frac{Dm}{\alpha\cdot\pi}\cdot\operatorname{asin}\left[\left(2\cdot\frac{x}{Dm} - 1\right)\cdot\sin\left(\alpha\cdot\frac{\pi}{2}\right)\right]$$



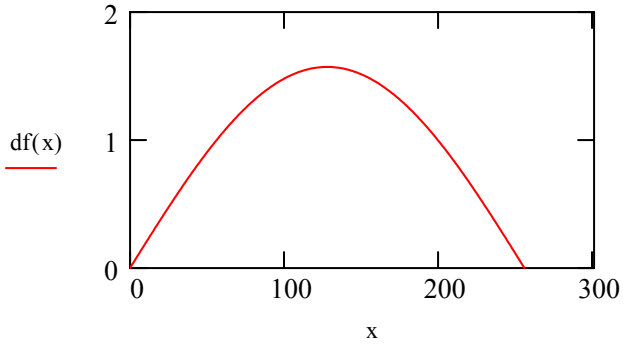
(a)

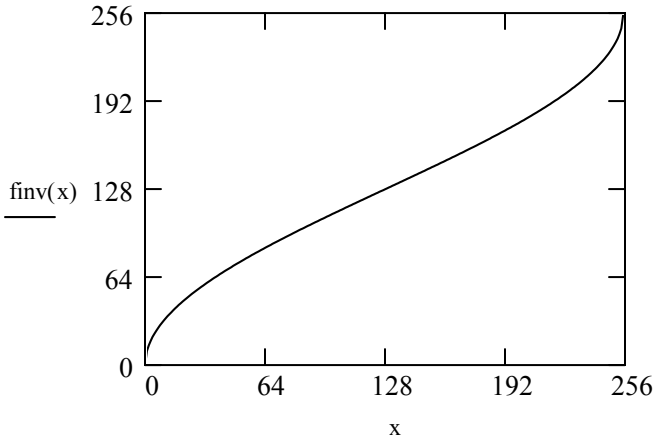


(b)

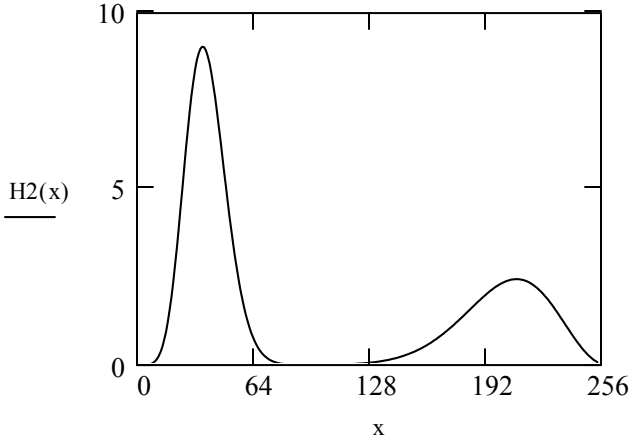
$$df(x) := \frac{\alpha\cdot\pi}{2\cdot\sin\left(\alpha\cdot\frac{\pi}{2}\right)}\cdot\cos\left[\alpha\cdot\pi\cdot\left(\frac{x}{Dm} - \frac{1}{2}\right)\right]$$

$$H2(D) := \frac{H1(finv(D))}{df(finv(D))}$$





(c)



(d)