Noktasal dönüşüm (ND)

ND nedir?

- gamma

- brightness

original

+ brightness

+ gamma

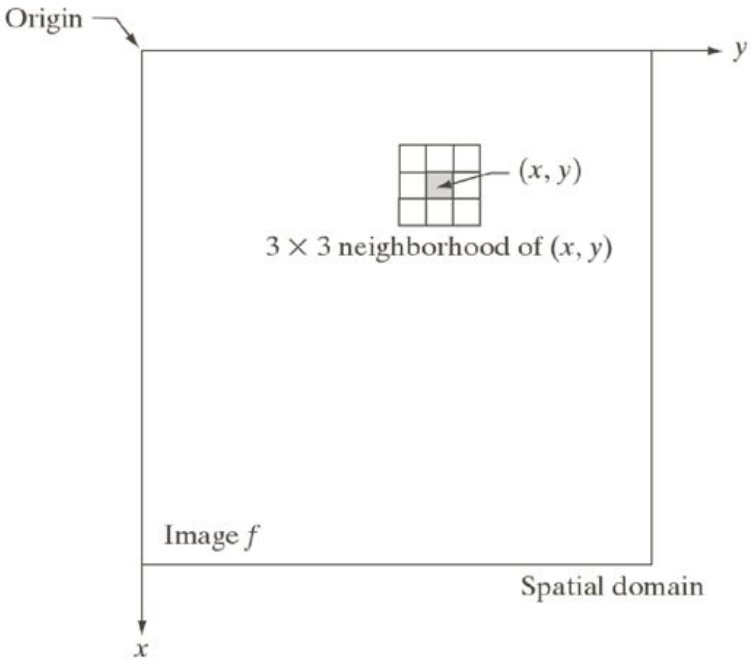
histogram mod

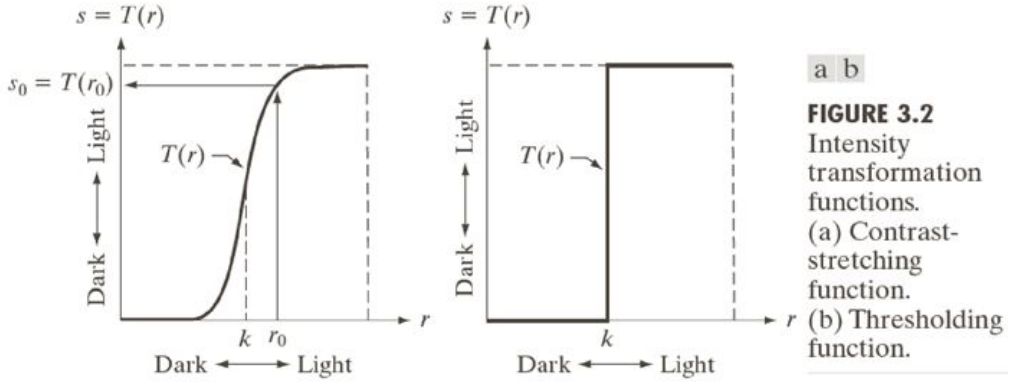
- contrast

+ contrast

histogram EQ

ND nasıl gerçekleştirilir?





a b

FIGURE 3.2 Intensity transformation functions. (a) Contrast-stretching function. (b) Thresholding function.

T: dönüşüm fonksiyonu
r: giriş yoğunluk değeri
s: çıkış yoğunluk değeri

T: Dönüşüm fonksiyonları

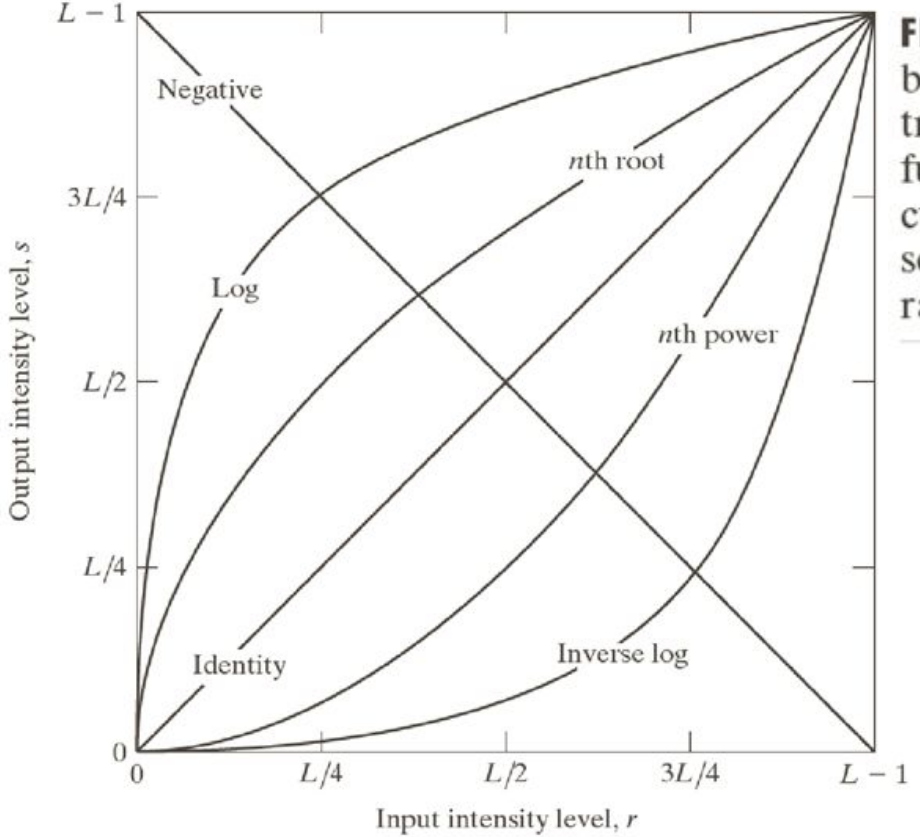
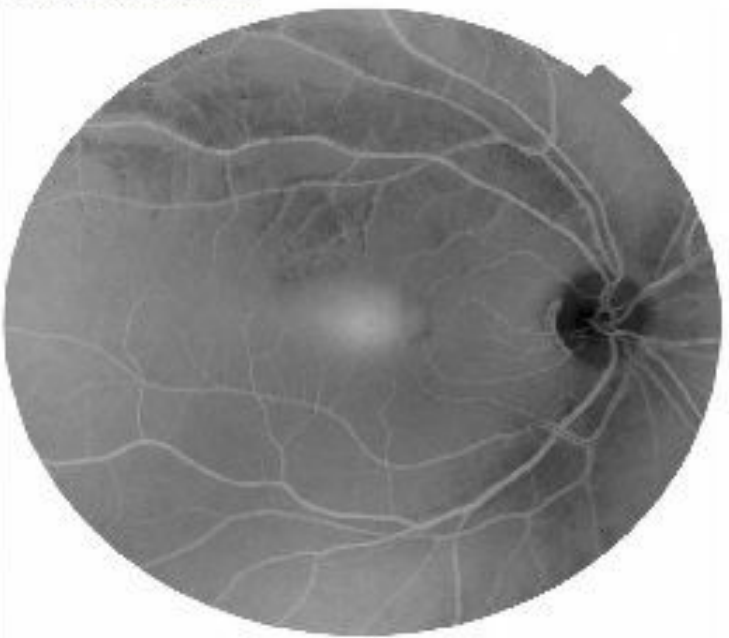
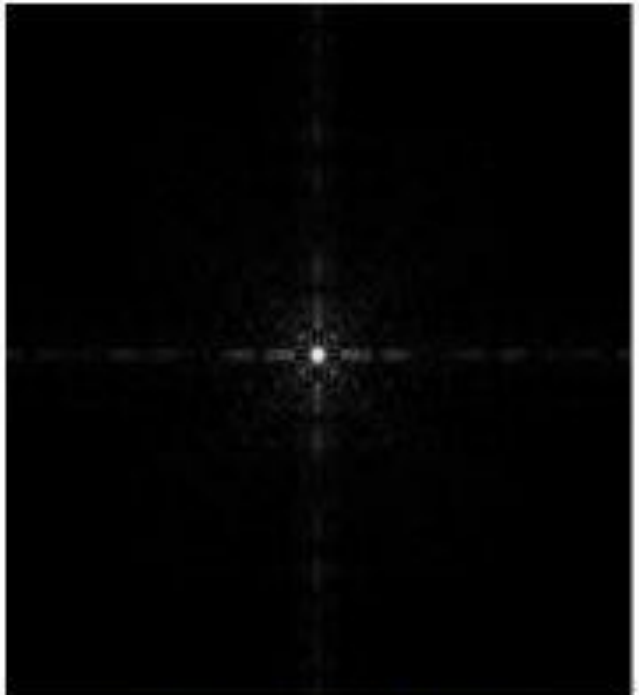


FIGURE 3.3 Some basic intensity transformation functions. All curves were scaled to fit in the range shown.

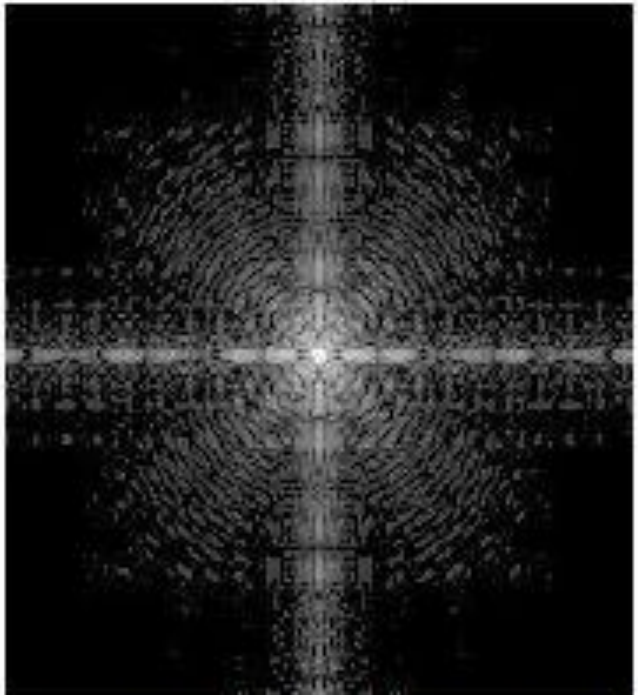
T: Negatif dönüşüm



T: Log dönüşüm



Image

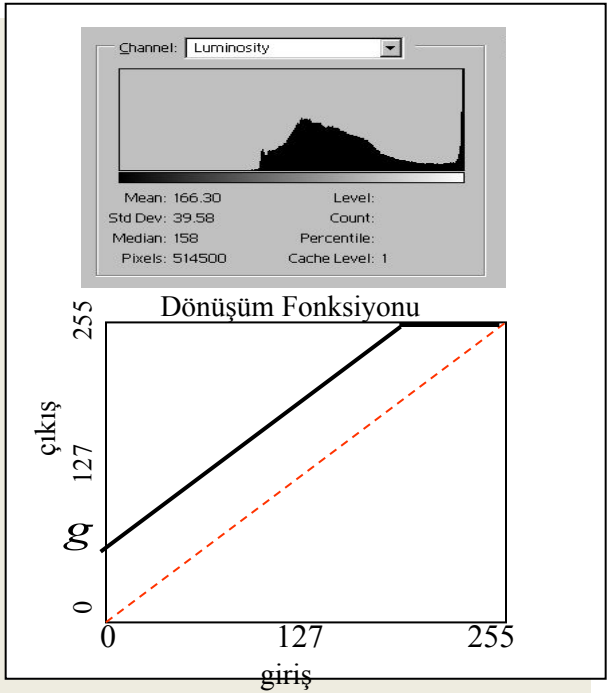


Log dönüşümü

T: Parlaklık artırma (+ brightness)

$$J_k(r,c) = \begin{cases} I_k(r,c) + g, & \text{if } I_k(r,c) + g < 256 \\ 255, & \text{if } I_k(r,c) + g > 255 \end{cases}$$

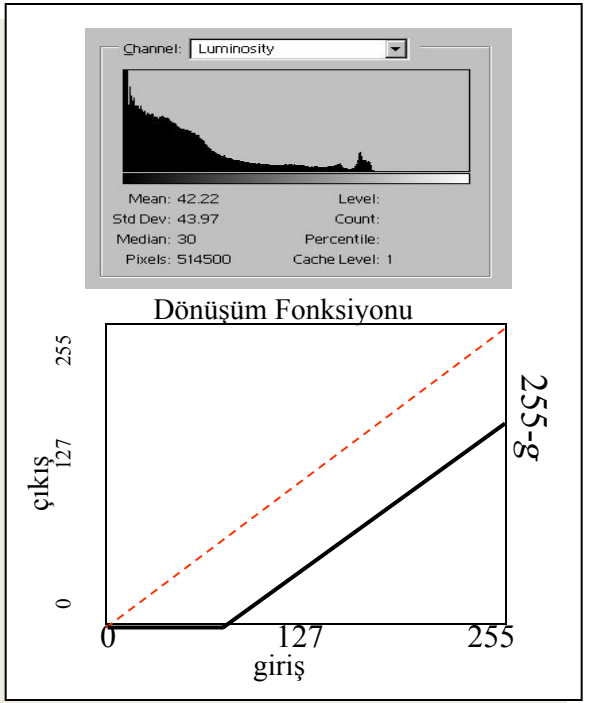
$g \geq 0$ ve $k \in \{1,2,3\}$ band indeksi



T: Parlaklık azaltma (- brightness)

$$J_k(r,c)=\begin{cases}0, & \text{if } I_k(r,c)-g<0\\ I_k(r,c)-g, & \text{if } I_k(r,c)\end{cases}$$

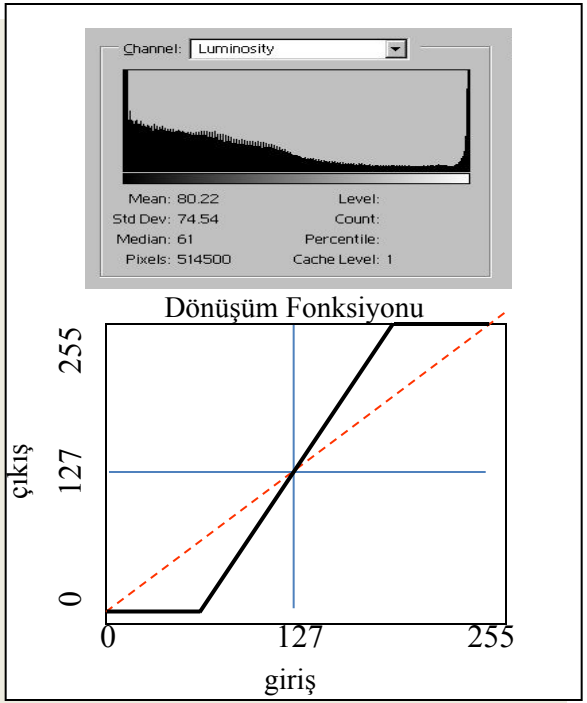
$g \geq 0$ ve $k \in \{1,2,3\}$ band indeksi



T: Kontrast artırma(+ contrast)

Let $T_k(r,c) = a\left[I_k(r,c) - 127\right] + 127$, where $a > 1.0$

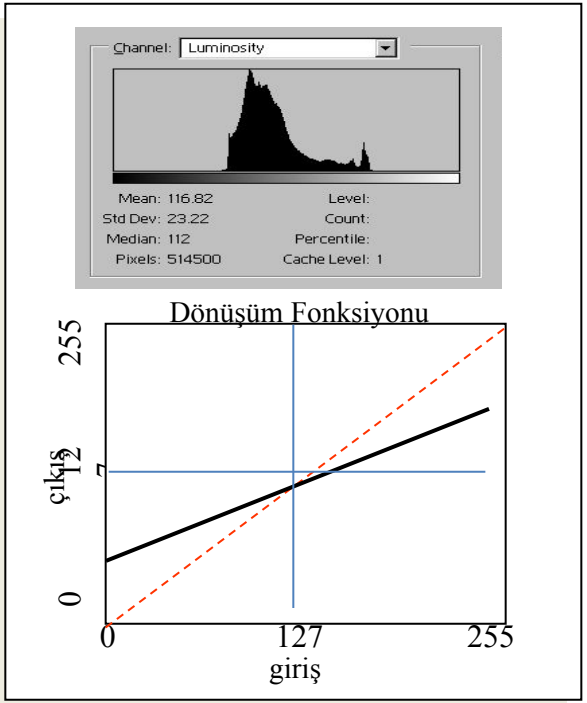
$$J_k(r,c) = \begin{cases} 0, & \text{if } T_k(r,c) < 0, \\ T_k(r,c), & \text{if } 0 \le T_k(r,c) \le 255, \\ 255, & \text{if } T_k(r,c) > 255. \end{cases} \quad k \in \{1,2,3\}$$



T: Kontrast artırma(- contrast)

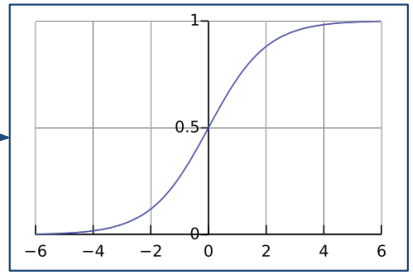
$$T_k(r,c) = a[I_k(r,c) - 127] + 127,$$

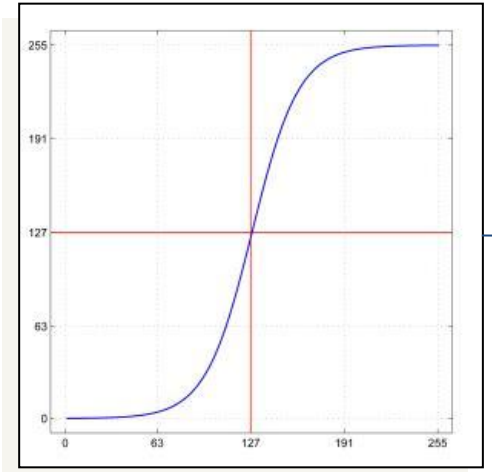
where $0 \le a < 1.0$ and $k \in \{1,2,3\}$.



T: Kontrast germe (contrast streching)

Sigmoid: $S(x) = \frac{1}{1+e^{-x}}$





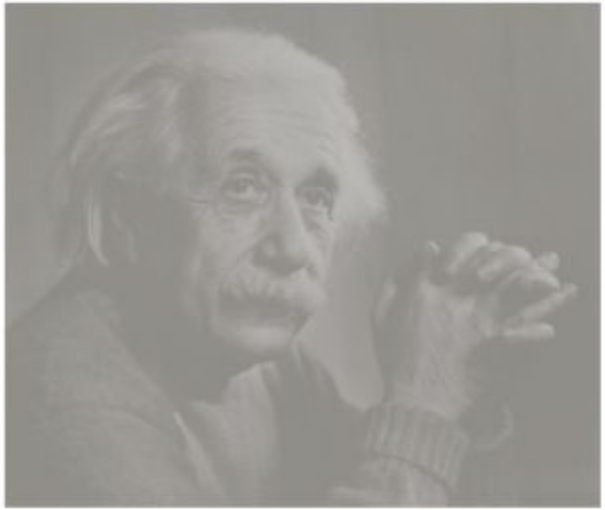
$$a = 2$$

$$x \in [0, 255]$$

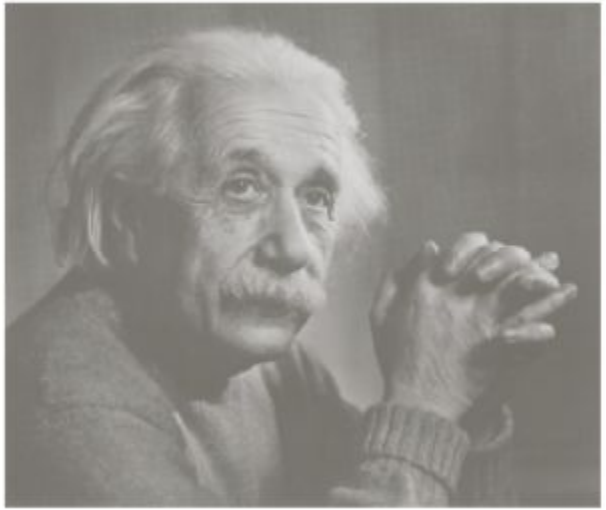
$$s = T(r, a) = \frac{255}{1+e^{-a(x-127)/32}}$$

Kontrast örneği

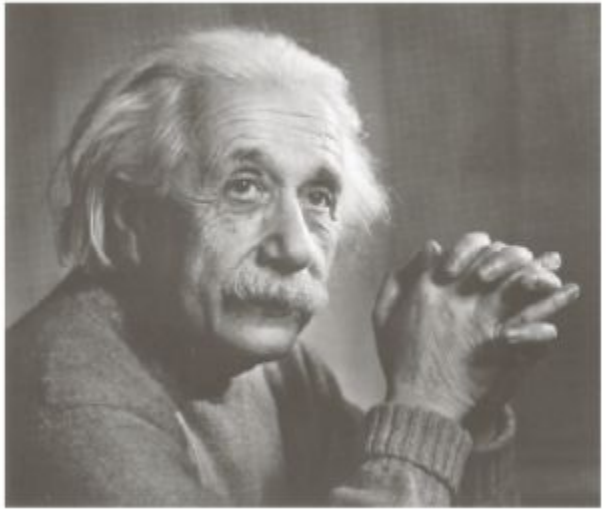
Düşük Kontrast



Normal Kontrast



Yüksek Kontrast



T: Gamma dönüşümü

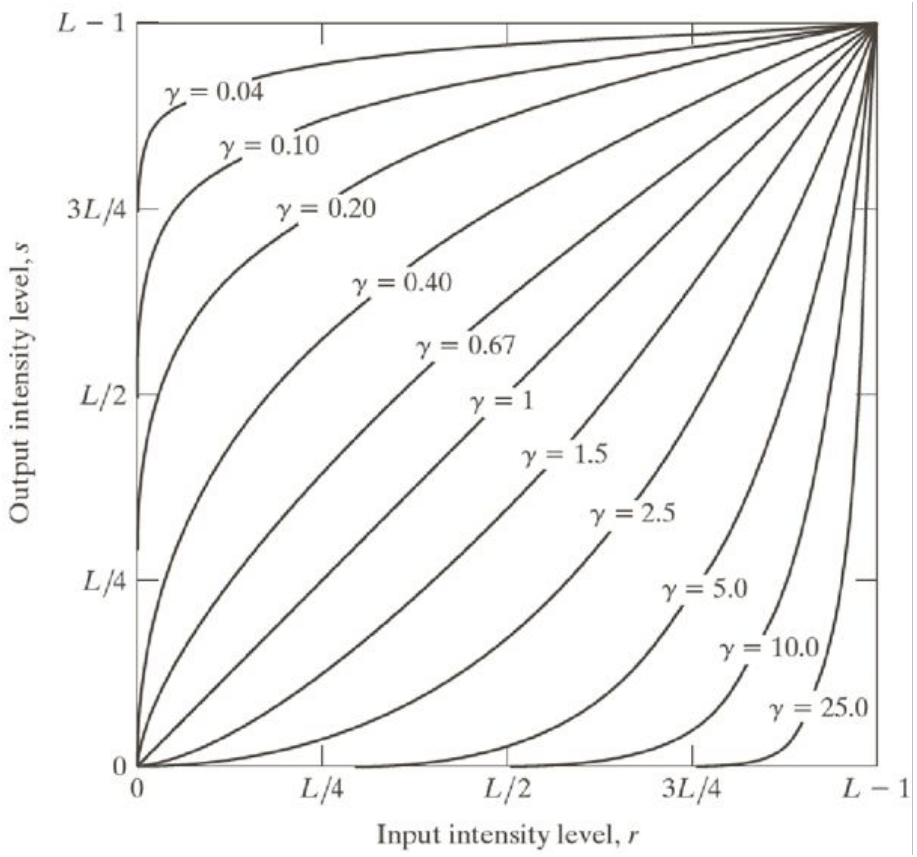
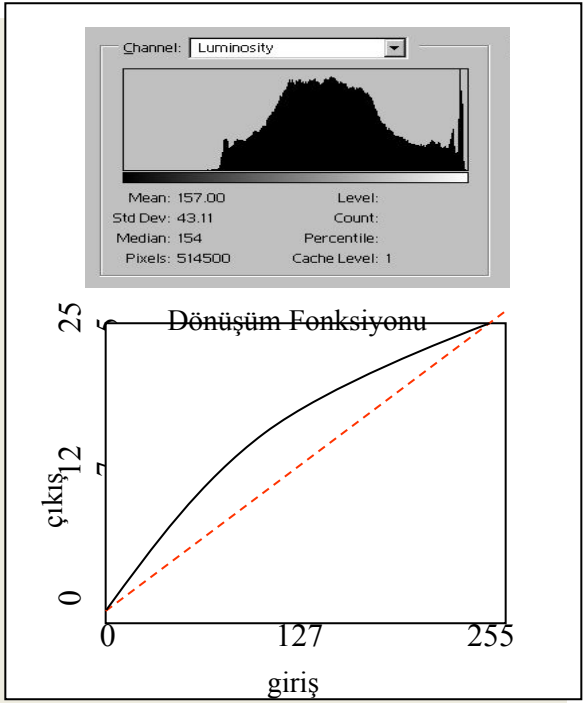


FIGURE 3.6 Plots of the equation $s = cr^{\gamma}$ for various values of γ ($c = 1$ in all cases). All curves were scaled to fit in the range shown.

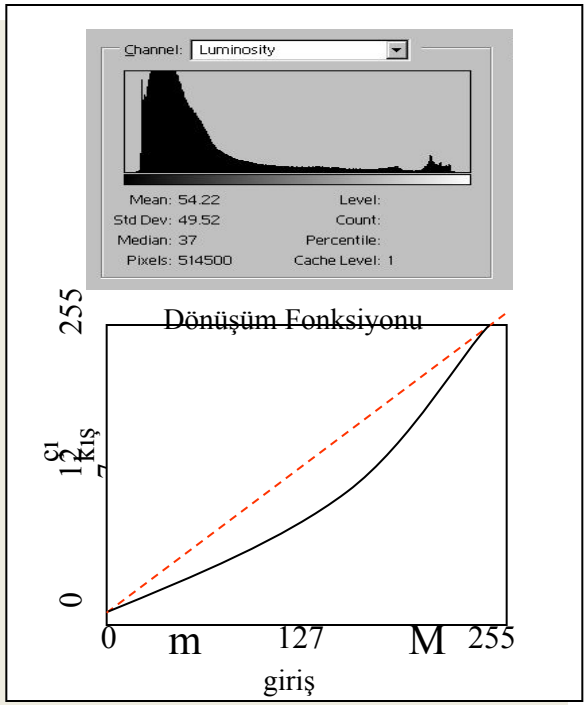
T: Gamma arttırma

$$J(r,c) = 255 \cdot \left[\frac{I(r,c)}{255} \right]^{1/\gamma} \quad \text{for} \quad \gamma > 1.0$$

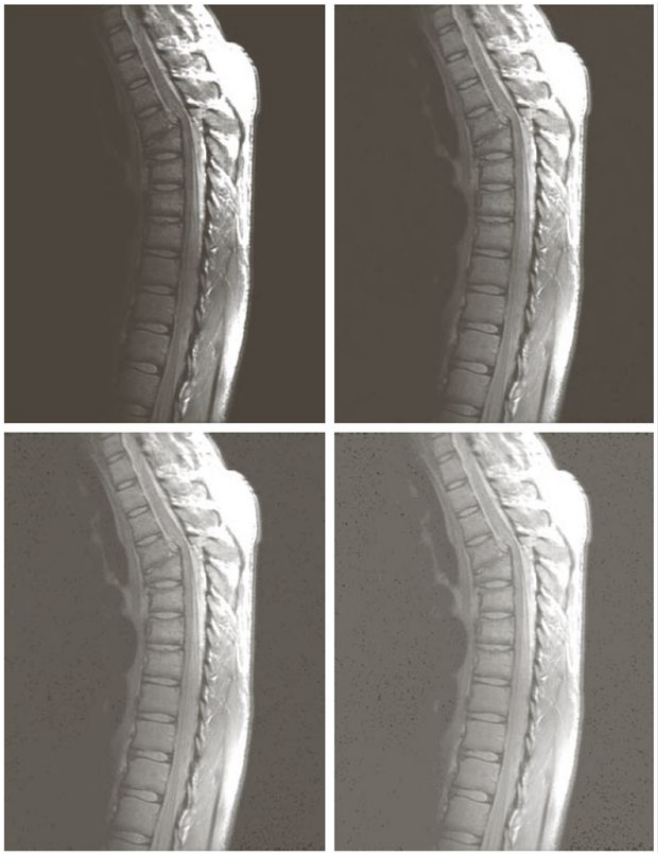


T: Gamma azaltma

$$J(r,c) = 255 \cdot \left[\frac{I(r,c)}{255} \right]^{1/\gamma} \quad \text{for} \quad \gamma < 1.0$$



T: Gamma dönüşüm etkisi



a b
c d

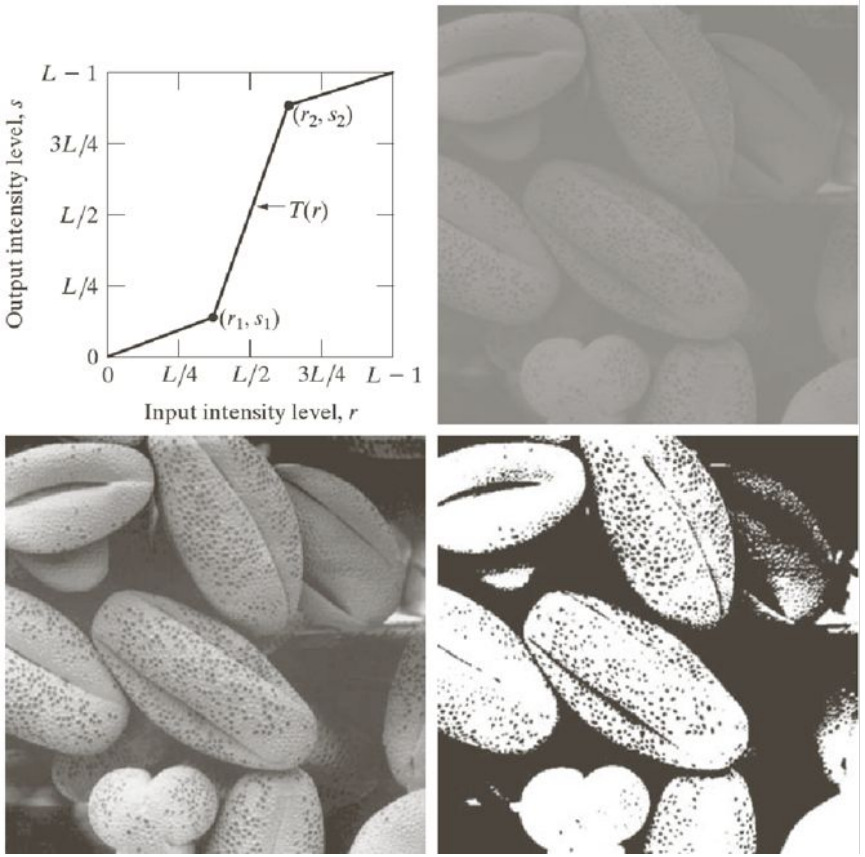
FIGURE 3.8
(a) Magnetic resonance image (MRI) of a fractured human spine.
(b)–(d) Results of applying the transformation in Eq. (3.2-3) with $c = 1$ and $\gamma = 0.6$, 0.4, and 0.3, respectively.
(Original image courtesy of Dr. David R. Pickens, Department of Radiology and Radiological Sciences, Vanderbilt University Medical Center.)

T: Gamma dönüşüm etkisi

a b
c d

FIGURE 3.9
(a) Aerial image. (b)–(d) Results of applying the transformation in Eq. (3.2-3) with $c = 1$ and $\gamma = 3.0$, 4.0, and 5.0, respectively. (Original image for this example courtesy of NASA.)

T: Özel dönüşümler



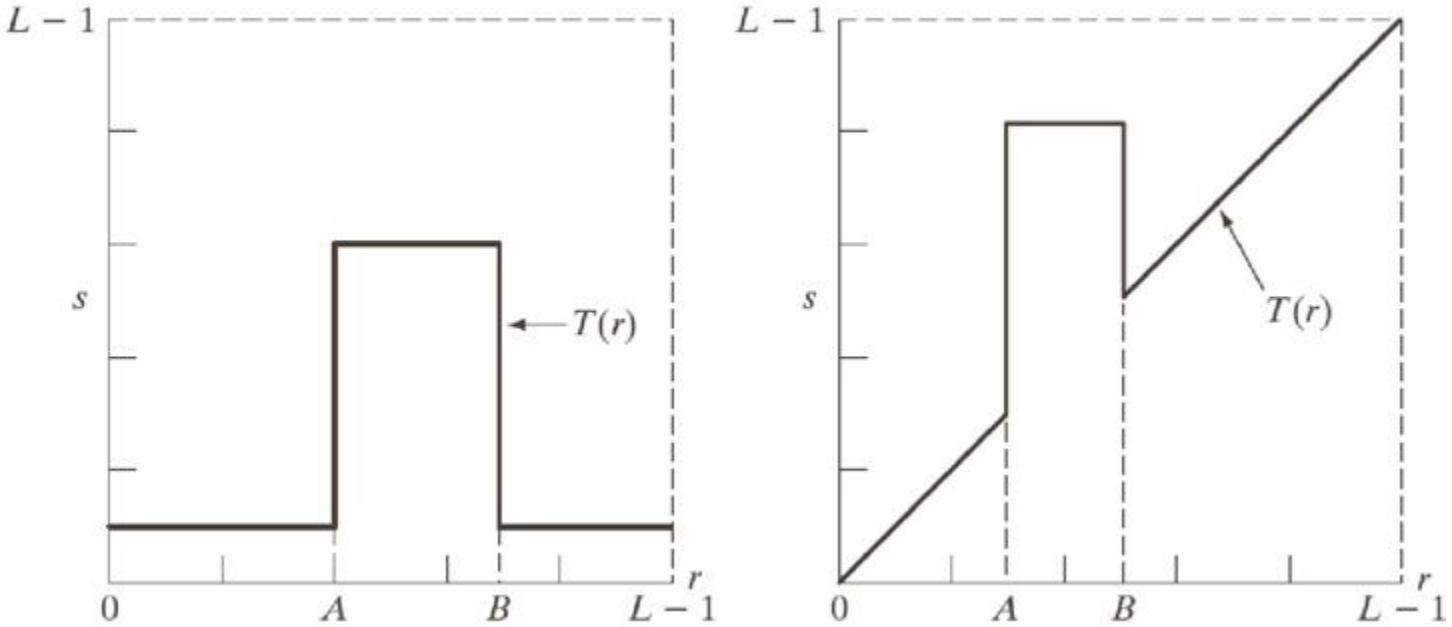
a b
c d

FIGURE 3.10 Contrast stretching. (a) Form of transformation function. (b) A low-contrast image. (c) Result of contrast stretching. (d) Result of thresholding. (Original image courtesy of Dr. Roger Heady, Research School of Biological Sciences, Australian National University, Canberra, Australia.)

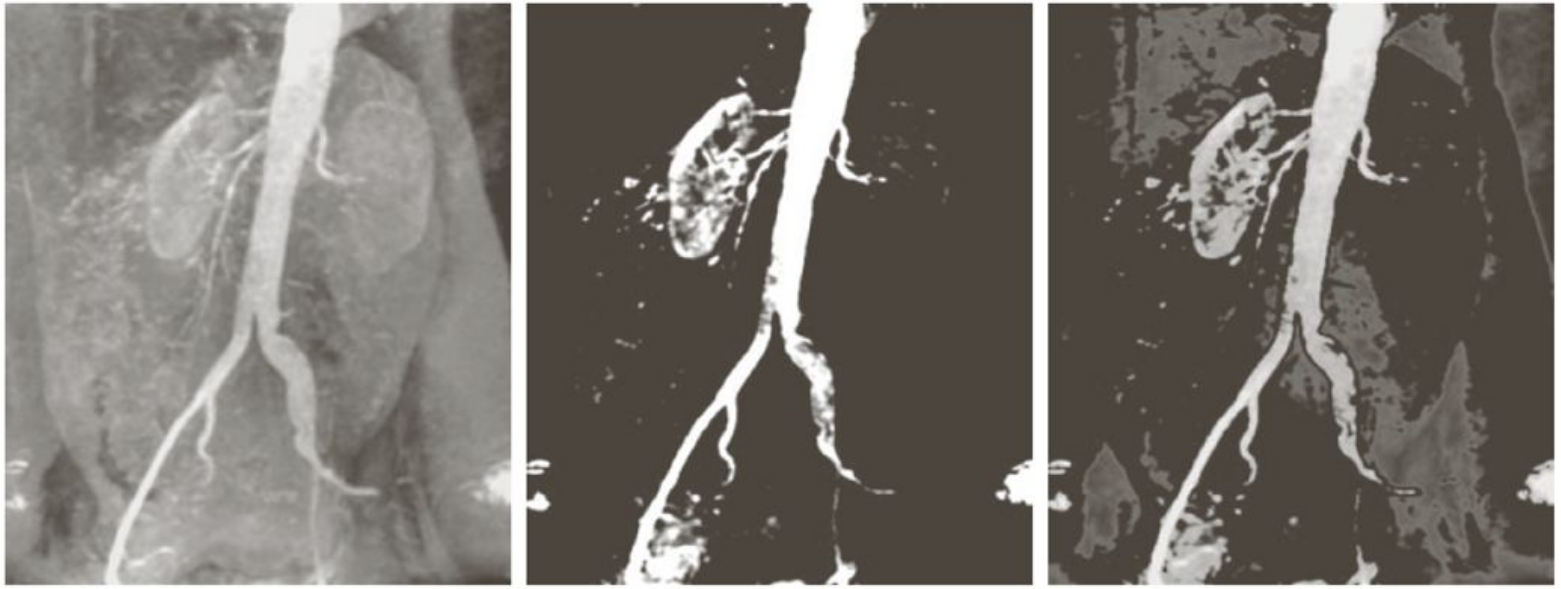
T: Özel dönüşümler

a b

FIGURE 3.11 (a) This transformation highlights intensity range $[A, B]$ and reduces all other intensities to a lower level. (b) This transformation highlights range $[A, B]$ and preserves all other intensity levels.



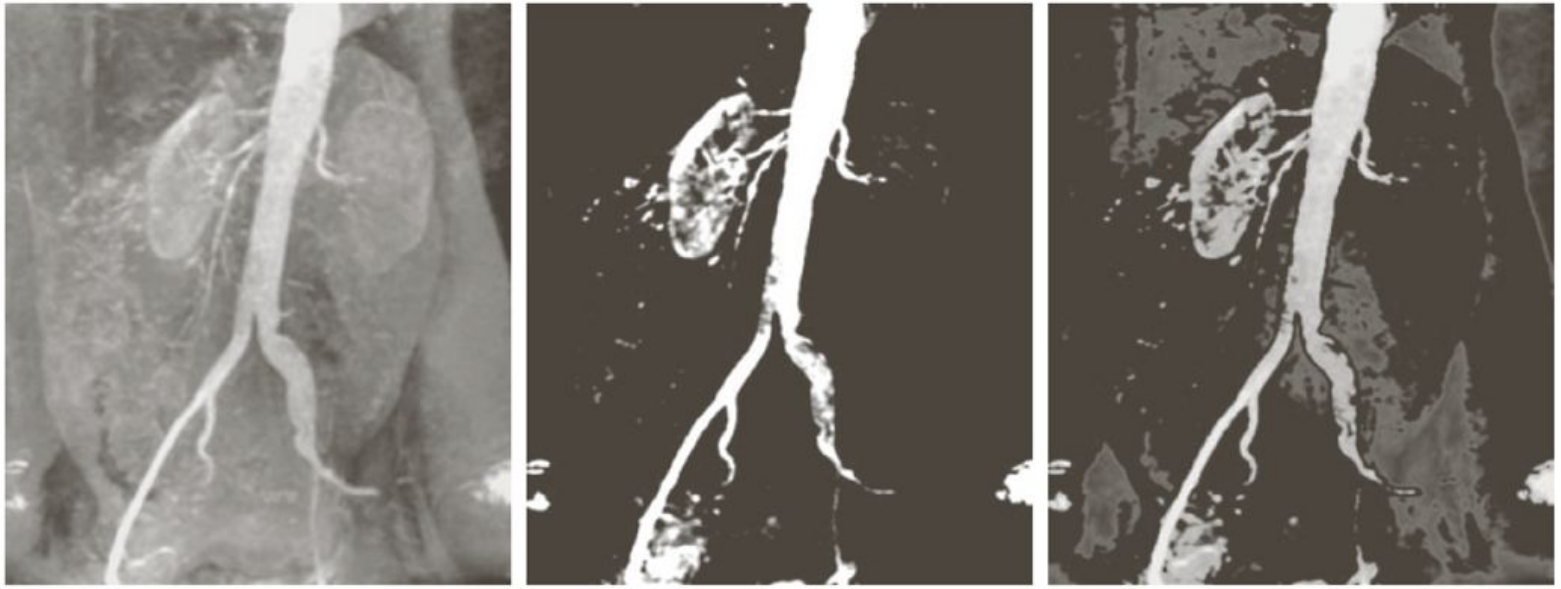
T: Özel dönüşümler



a b c

FIGURE 3.12 (a) Aortic angiogram. (b) Result of using a slicing transformation of the type illustrated in Fig. 3.11(a), with the range of intensities of interest selected in the upper end of the gray scale. (c) Result of using the transformation in Fig. 3.11(b), with the selected area set to black, so that grays in the area of the blood vessels and kidneys were preserved. (Original image courtesy of Dr. Thomas R. Gest, University of Michigan Medical School.)

T: Özel dönüşümler



a b c

FIGURE 3.12 (a) Aortic angiogram. (b) Result of using a slicing transformation of the type illustrated in Fig. 3.11(a), with the range of intensities of interest selected in the upper end of the gray scale. (c) Result of using the transformation in Fig. 3.11(b), with the selected area set to black, so that grays in the area of the blood vessels and kidneys were preserved. (Original image courtesy of Dr. Thomas R. Gest, University of Michigan Medical School.)