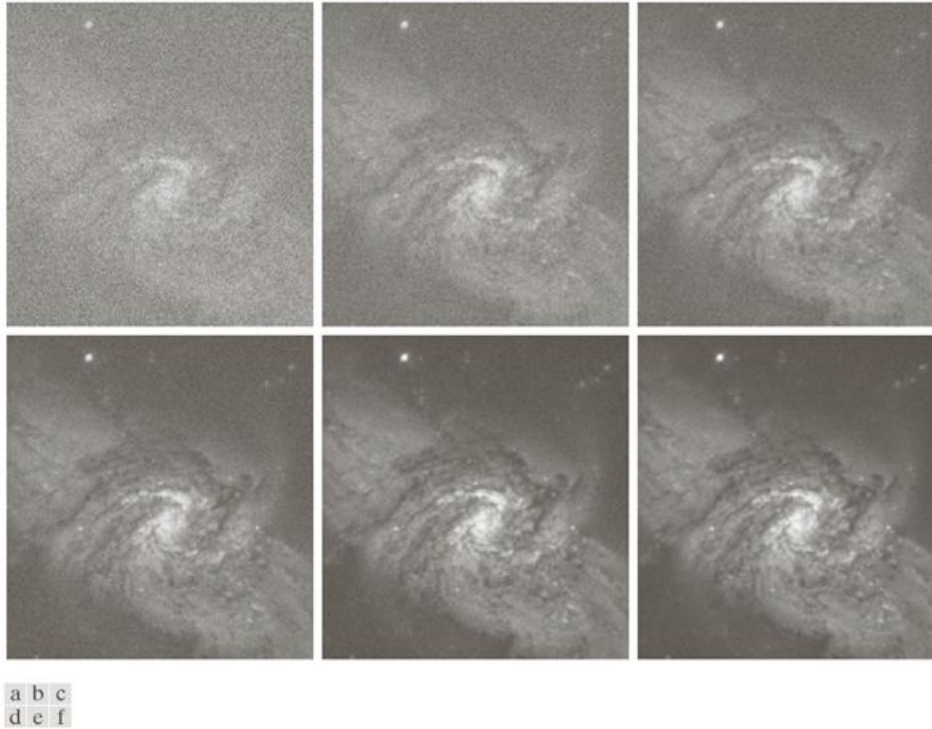


# Toplama, Çıkarma, Çarpma

Addition, Subtraction, Multiplication

# Toplama



**FIGURE 2.26** (a) Image of Galaxy Pair NGC 3314 corrupted by additive Gaussian noise. (b)–(f) Results of averaging 5, 10, 20, 50, and 100 noisy images, respectively. (Original image courtesy of NASA.)

# Toplama

I1



I2



I1 + I2



$(I1 + I2) / 2$



$I1/2 + I2/2$



$I1 \rightarrow 183$

$I2 \rightarrow 152$

$(183+152)/2 \Rightarrow 335/2 \Rightarrow 255/2 \Rightarrow 128$

$92 + 76 = 168$

# Toplama - *alpha blending*

$$I_{\text{new}} = I_1 * \alpha + I_2 * (1-\alpha)$$



$\alpha=0.85$



$\alpha=0.15$

## Çıkarma) Örnek-1



$I_1 - I_2$

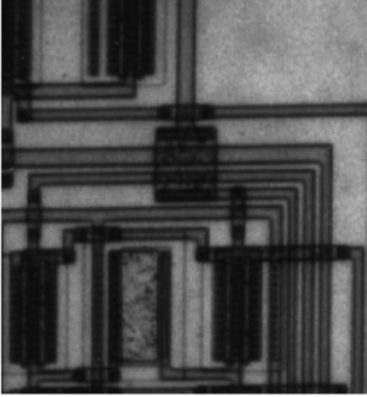
*Not:* Fark sonucu 0-255 dışına taşabilir. 0'ın altı 0, 255'in üstü 255 olarak güncellenir. İf komutunu kullanmadan aynı sonuç  $(a-b) + (b-a)$  ile elde edilebilir.



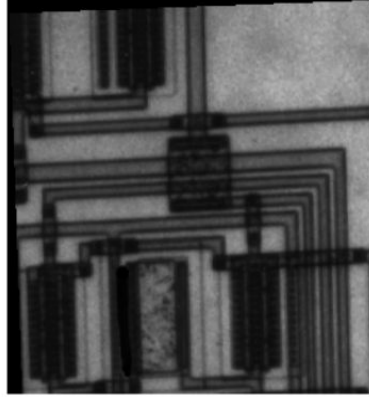
$(I_1 - I_2) + (I_2 - I_1)$

## Çıkarma) Örnek-2

Sağlam (A)

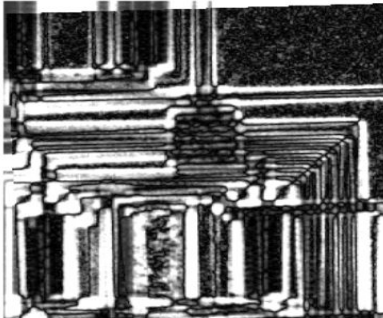


Hatalı (B)



Hata nerede?

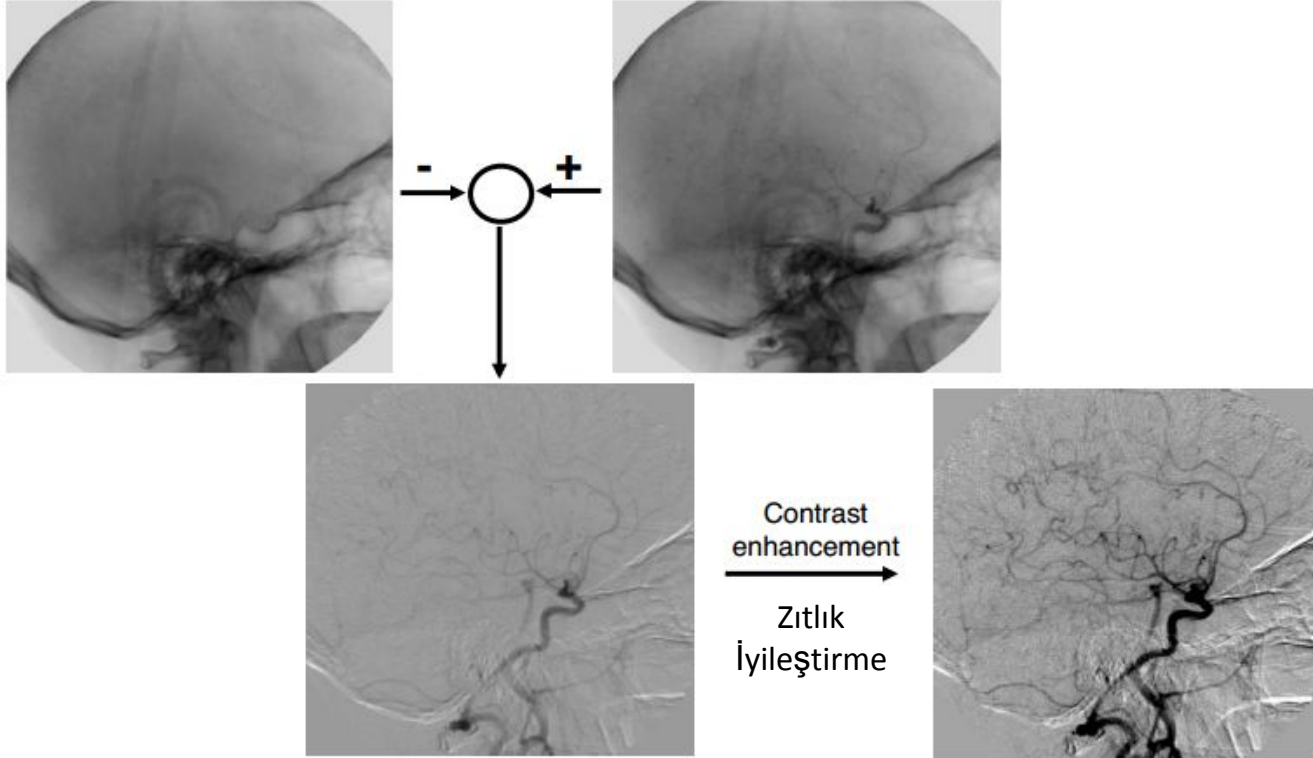
A-B



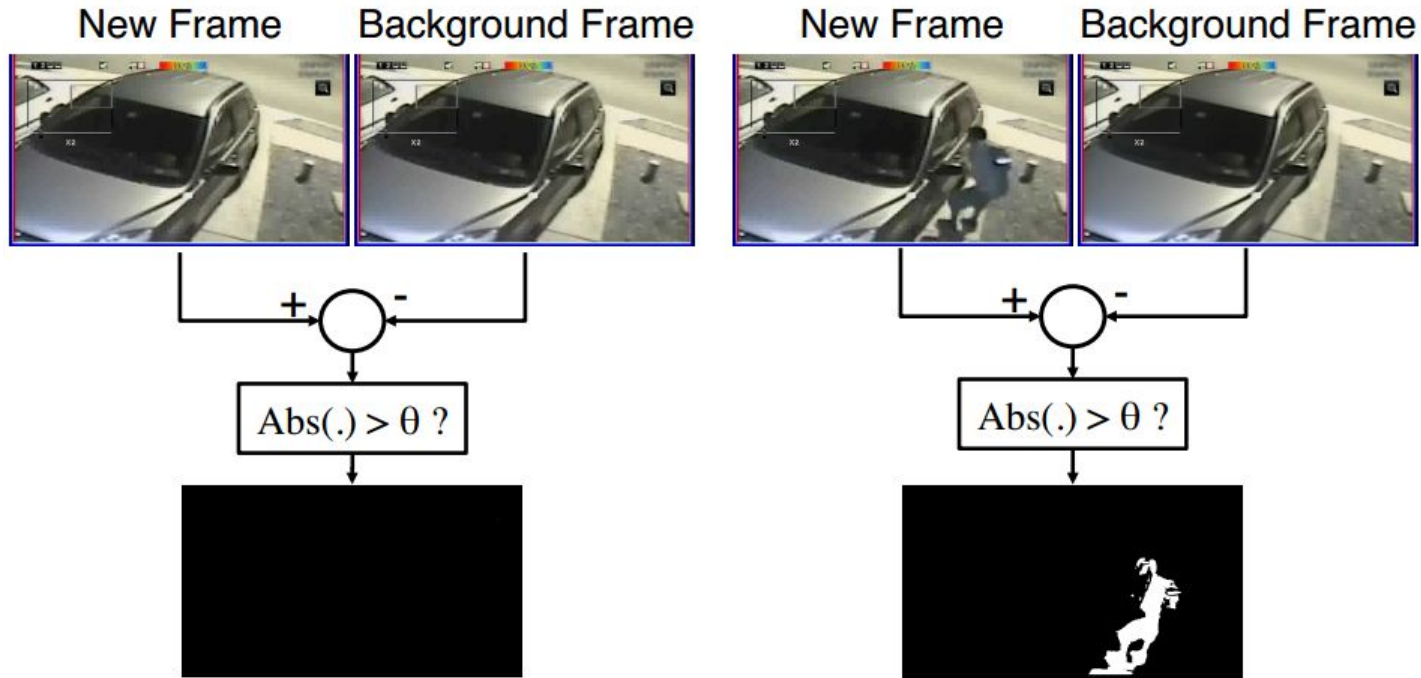
$|A-B| > \text{thr}$



## Çıkarma) Örnek-3



# Çıkarma) Örnek-4



**Update:**  $\text{Background}[t] := \alpha \text{Background}[t-1] + (1 - \alpha) \text{New}[t]$



# Çarpma (noktasal)

**Soru)** Gölge görüntüsünü nasıl elde edersin?

Orijinal Görüntü

A



Gölge Örüntüsü

B



İşlenmiş Görüntü

$C = A \cdot (255 - B)$

