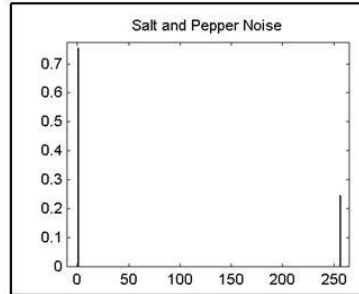
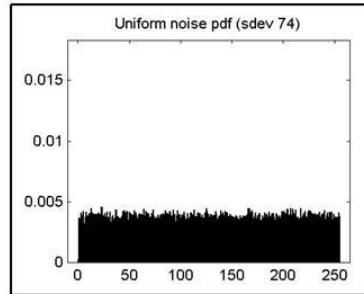
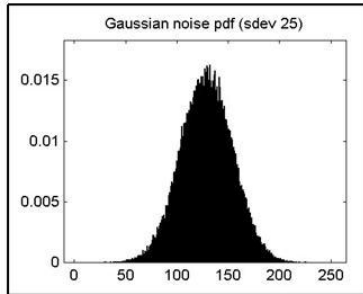
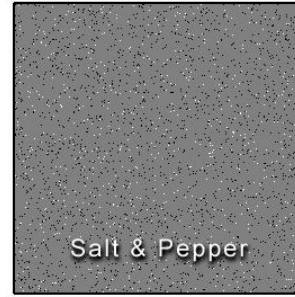
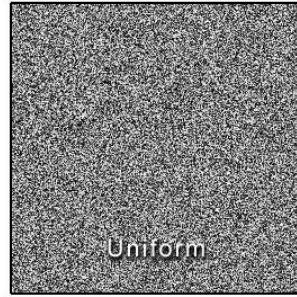
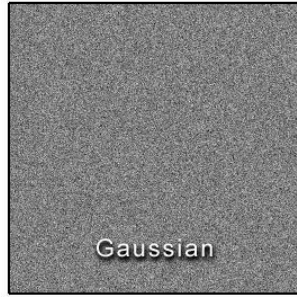


Gürültü Temizleme-1

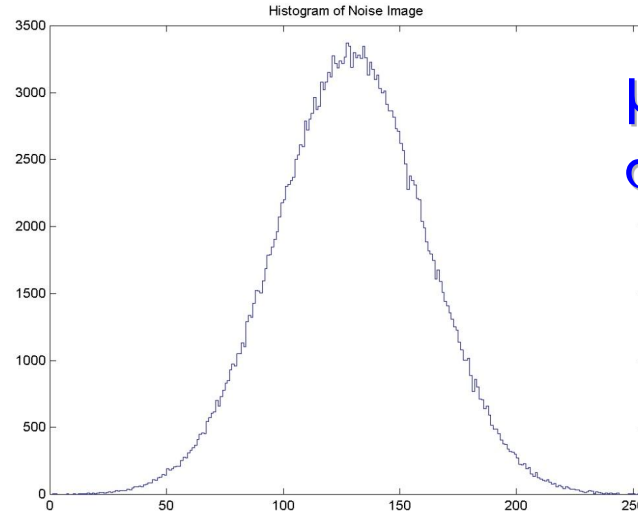
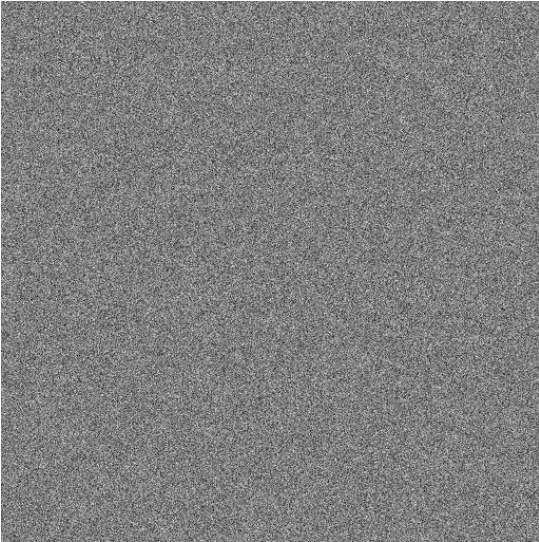
Noise Reducing

Gürültü Tipleri



Gaussian IID Gürültü

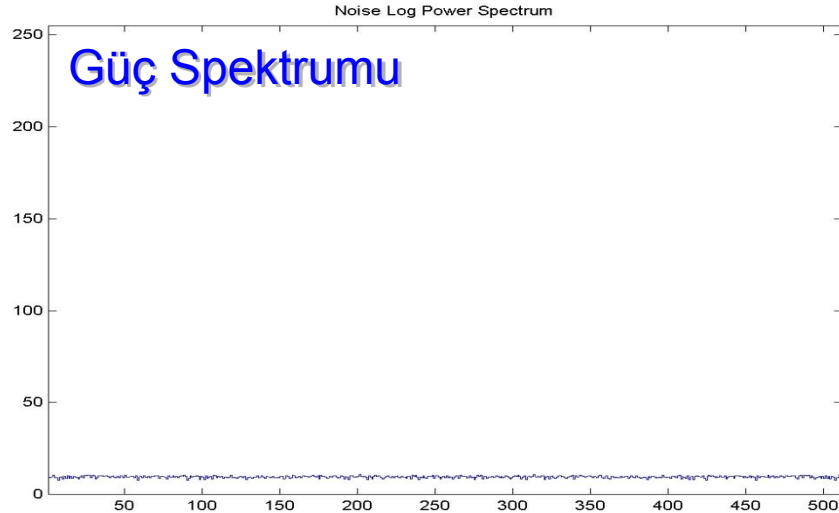
IID \Rightarrow uzaysal
ilişki yok



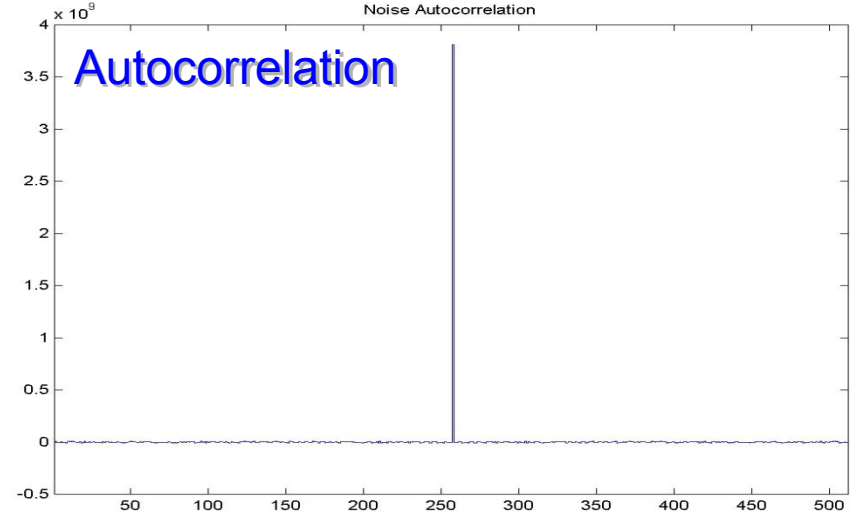
$$\mu = 128$$
$$\sigma = 32$$

IID: Independent, Identically Distributed
Bağımsız ve eşit dağılımlı

IID gürültünün güç spektrumu & Autocorrelation



$$PS(I) = |F(I)|^2$$

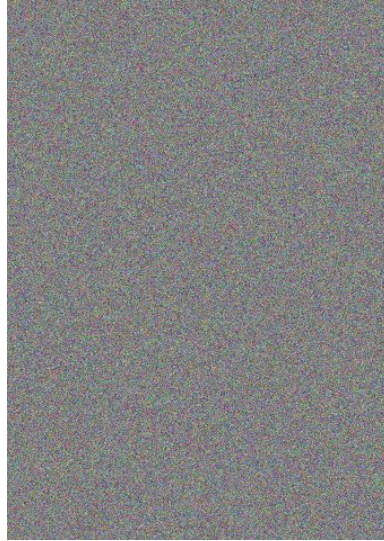


$$R(I) = \text{Re} \left[F^{-1} \left\{ |F(I)|^2 \right\} \right]$$

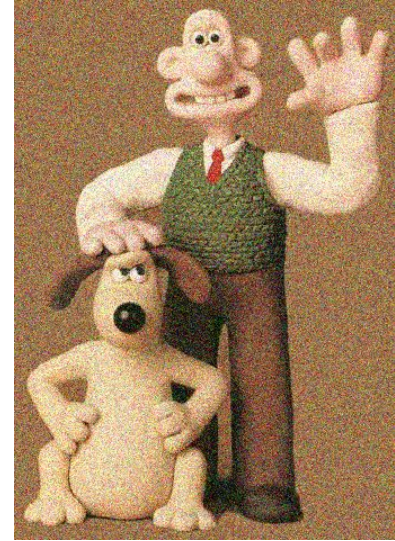
Eklemeli Gürültü



Orijinal Görüntü



Gürültü İmgesi



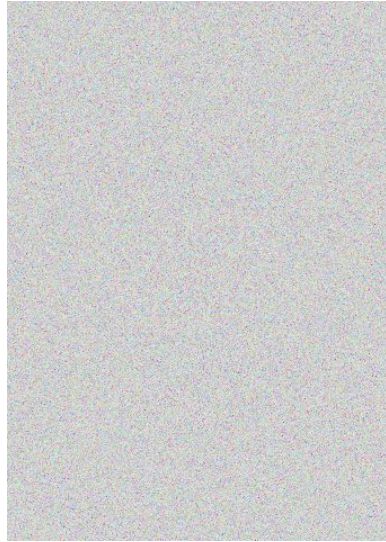
Orijinal + Gürültü

Ekleme Güürütü (Güç spektrumu)

$$\text{Ekran çıktıı} \\ \log\{|F(I)|^2 + 1\}$$



görüntü PS



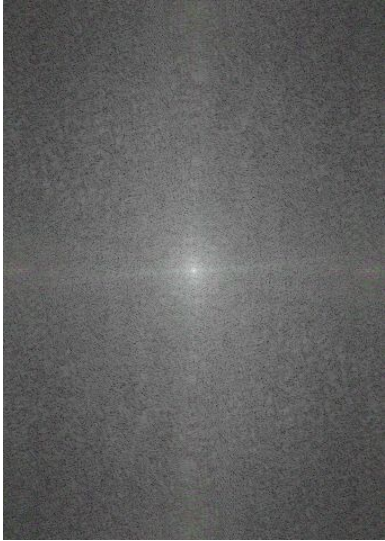
gürültü PS



görüntü + gürültü PS

Ekleme Gürültü (Güç spektrumu)

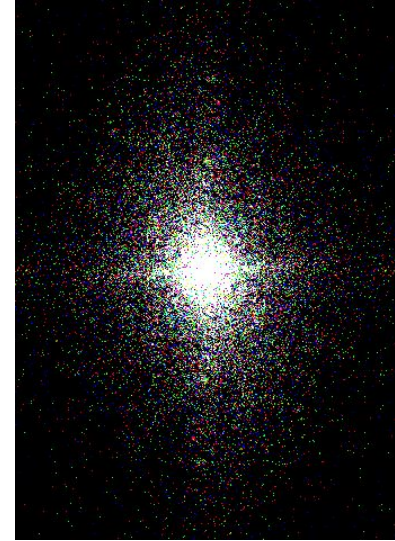
Ekran çıktısı:
 $\log\{|F(I)|^2 + 1\}$



görüntü PS



görüntü + gürültü PS



görüntü PS > gürültü PS

Bulanıklaştırma ile gürültü temizleme



görüntü



10% gaussian noise



7x7 gaussian filtresi
 $\sigma^2=1.5$

Bulanıklaştırma ile gürültü temizleme



görüntü



30% gaussian gürültü

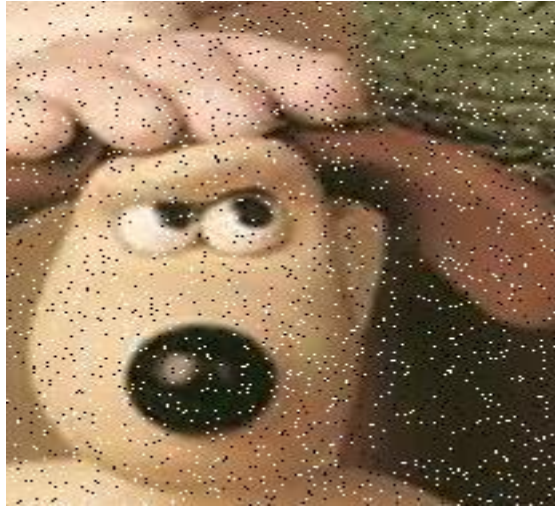


7x7 gaussian filtresi
 $\sigma^2=1.5$

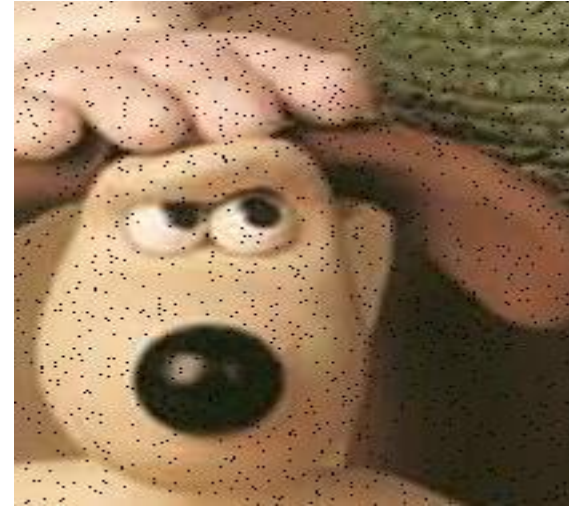
Tuz Biber (Salt & Pepper) Gürültüsü



+ tuz



tuz&biber



- tuz

Tuz Biber (Salt & Pepper) Gürültüsü



Tuz & biber

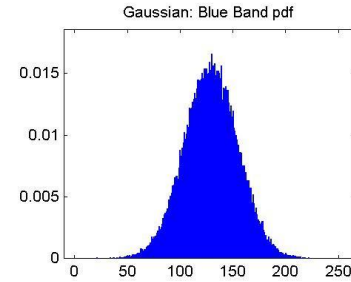
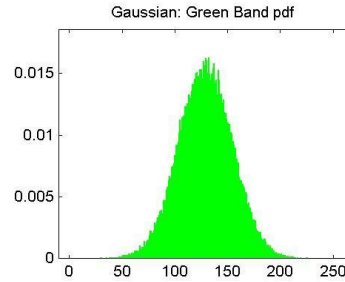
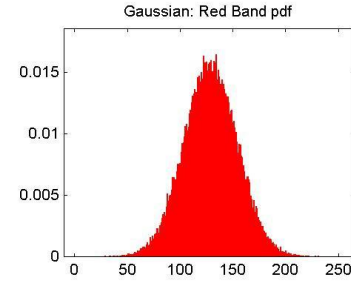
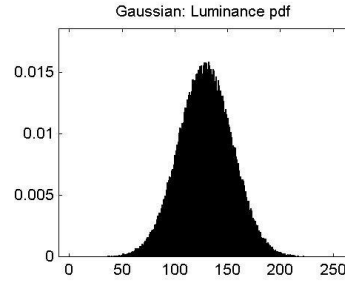
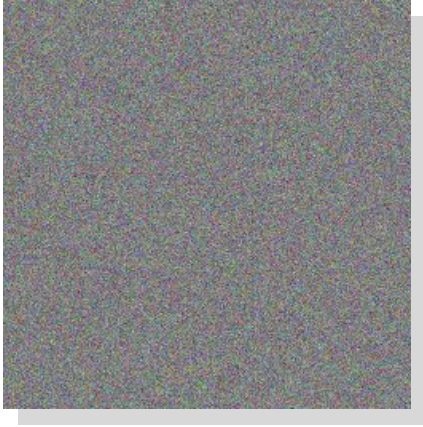


7x7 gaussian filtresi
 $\sigma^2=1.5$



3x3 median filtresi

Gürültü tipi: Renkli - Gaussian



Bulanıklaştırma ile gürültü temizleme



görüntü

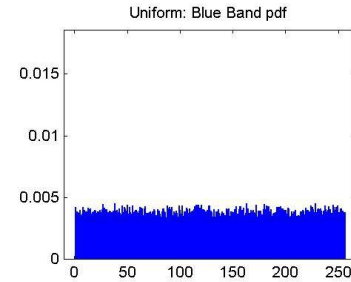
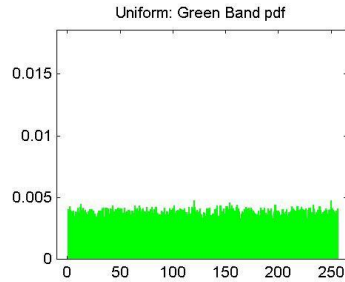
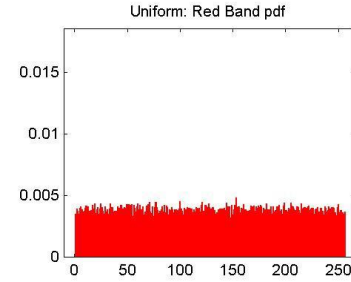
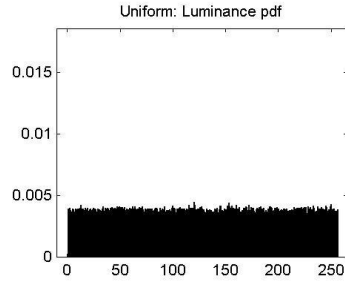
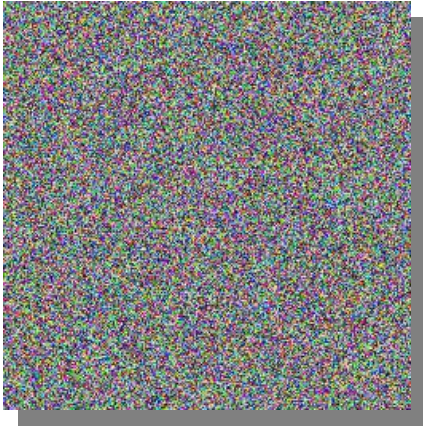


10% gaussian gürültü



7x7 gaussian filtresi
 $\sigma^2=1.5$

Gürültü tipi: Renkli - Uniform



Bulanıklaştırma ile gürültü temizleme



görüntü



10% uniform noise



7x7 gaussian filtresi
 $\sigma^2=1.5$